amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

VOL. 49, No. 3 MARCH 1981

FEATURED IN THIS ISSUE:

- ★ A REVIEW OF ANTENNA NOISE BRIDGES
- ★ AMATEUR RADIO — WHERE TO IN THE 1980s?
- ★ WORLD-WIDE COMMUNICATIONS FROM HAND-HELD AND MAN-PACK TRANSCEIVERS
- ★ AMATEUR RADIO ALONG THE CANNING STOCK ROUTE

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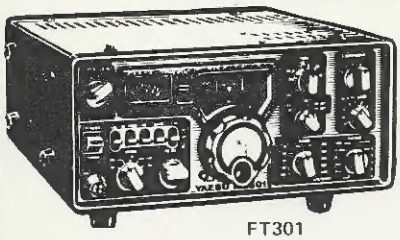
YAESU FT301 NEAR COST!



FT301

Yes, we only have 2 of these amazing rigs left (one at our York St Sydney store & the other at Adelaide). Features 200W PEP on 160-10M ● wideband tuning ● SWR protection circuitry ● requires only 12V DC ● AM/FM/CW/FSK modes ● speech processor ● VOX ● VFO/Fixed channel selector ● drive control PLUS MUCH MORE! Yes, the FT301 is still the rig for today's active amateur. Cat. D-2870

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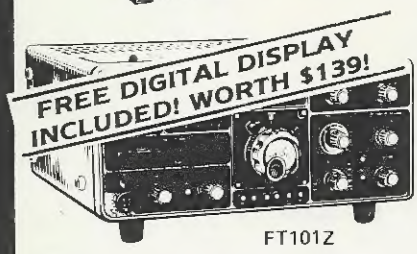

FT101Z

If you want a good reliable base station rig – at an incredible saving – then the Yaesu FT101Z is for you! Features SSB and CW modes plus a clarifier on either or both transmit and receive. It also has a VOX control. The FT101Z is fully compatible with the FT901 series of accessories – that's versatility!!! Today's technology at an old fashioned price. Cat. D-2862

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SAVE $124 – THE RADIO OF TOMORROW AT YESTERDAYS PRICE!

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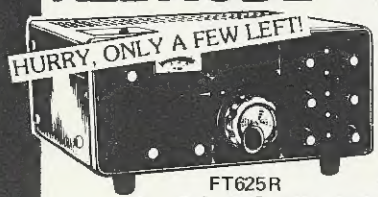
LAST FEW FT625R 6M ALL MODE TRANSCEIVER



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Six metres is alive & well and you'll feel well when you hear the price! You get a built in RF speech processor, a high quality noise blanker & a +/– 1MHz repeater split for FM buffs. Everday there is something new & exciting on 6 metres – check it out and save a bundle! Cat. D-2886

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Registered Office:
3/105 Hawthorn Road,
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EDITOR:
BRUCE BATHOLS* VK3UV

PRODUCTION MANAGER:
BILL BALY

TECHNICAL EDITORS:
BILL RICE* VK3ABP
EVAN JARMAN* VK3ANI
RON COOK* VK3AFW
GIL SONES* VK3AUI

CONTRIBUTING EDITORS:
BOB ARNOLD VK3ZBB
G. NICK NICHOLS VK6XI
ROY HARTKOPF* VK3AOH
RON FISHER* VK3OM
ERIC JAMIESON VK5LP
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BUSINESS MANAGER:
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***Member of Publications Committee**

Enquiries and material to:
The Editor,
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Cover Photo

No, it's not a Kenwood Ad. She's Terryl, XYL of Will VK6UU, at the summit of Mt. Toolbrunup near Albany, W.A., during a repeater exercise. See story on page 24.

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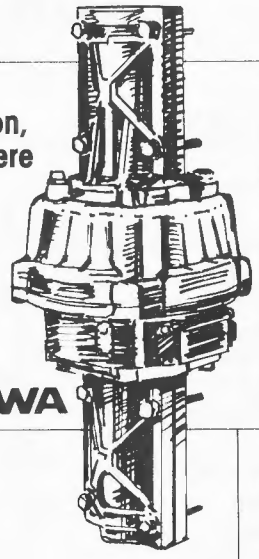

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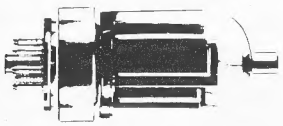

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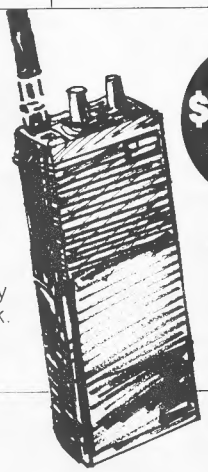

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Coax switches and relays.

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DAIWA quality 2 position
CS201 **$24**
DAIWA quality 4 position
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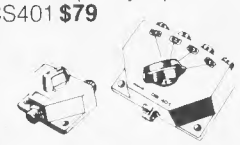

Relays:
Vicom 150W to 1.5 GHZ
CX120A **$24**
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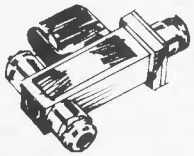
CX600N **$52**



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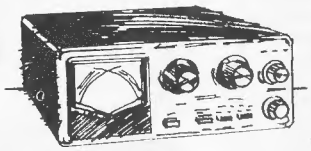
Unique Cross Needle SWR/PWR meters + Antenna Tuners.



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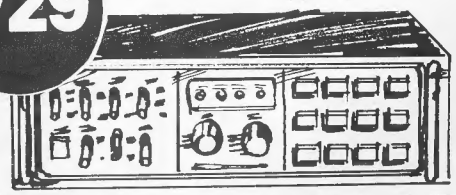

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Ringo.

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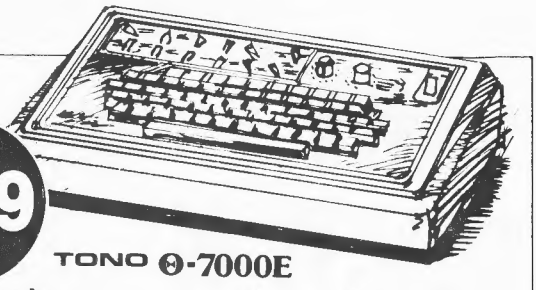
$69



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2M beam 9.5dbd Gain.

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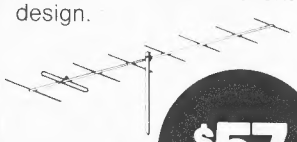
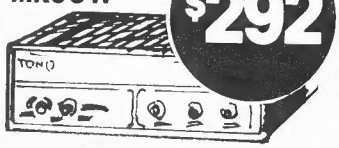


$57

Jaybeam

2M Linear MR90W

$292



Tono's new solid state linear incorporates a receiver pre-amp into the 80-90 Watt unit. Handles 2 metre models SSB/FM/CW/RTTY. Model MR1300E 120-130W **$357**

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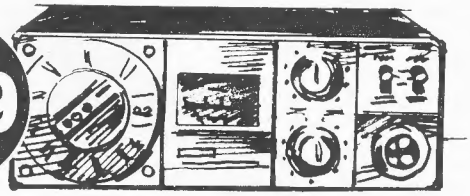
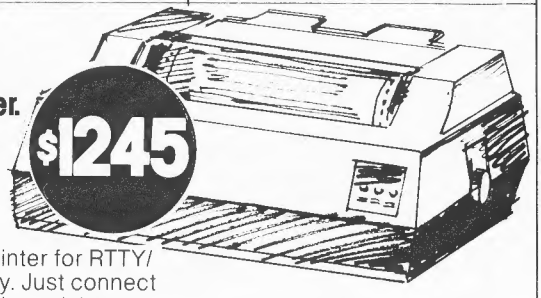
IC22S $329



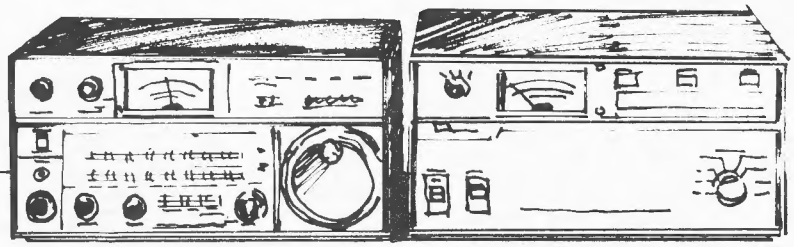
RTTY Printer.

$1245



Dot matrix printer for RTTY/ CW hard copy. Just connect to your tono demodulator. Also available with most RTTY systems.

TONO Θ



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QSP —

THE UNKNOWN

Even before most of us obtained our licenses we realised that the "lifeblood" of our hobby — our frequency bands — are sandwiched between neighbours who are envious and sometimes greedy, and this, coupled with a plethora of regulations, generally causes amateurs (and potential amateurs) to seek assurance through joining with others in the interests of self-preservation.

Unity provides strength and the WIA is that strength and has been so for some 70 years.

It was primarily for these reasons (bands and regulations) that our Institute, and for that matter most of the overseas sister societies, were established.

The WIA however, has many other facets and responsibilities — QSL bureaux, AR, call-book, repeaters, beacons, educational facilities, meeting places, et al.

The overall policies essential for these facilities are established at Federal Conventions; perhaps this term is a misnomer because it is actually the annual general meeting of the WIA. This event is where the seven members of the Federal organisation, namely the seven Divisions of the WIA, meet with the Executive — this year early in May.

The Executive is the means by which policy is preserved between Conventions. It is also the facility through which communications are maintained with local authorities and international bodies.

In summary, the WIA exists to serve YOU, the member. Our QSL bureaux exist for no other reason than to provide a service to members. Our journal, AR, is not merely a vehicle for commercial operations but is also the voice of organised amateur radio in Australia. Our frequency bands do not assist the Institute in a commercial sense although without them, there would be no WIA or radio amateurs either!

Therefore if you, your Club, your specialist group or your Division, considers that a policy needs to be changed or a new one established, the correct way to achieve this is have the matter discussed at a Federal Convention on initiation by your Division. The Divisional Federal Councillor cannot operate in a vacuum; he needs your thoughts and views — without them they are unknown to everyone except yourself.

P. WOLFENDEN VK3ZPA
Federal President ■

WIRELESS INSTITUTE OF AUSTRALIA

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Executive Office: 3/105 Hawthorn Rd., Caulfield North, Vic. 3161. Ph. (03) 528 5962.

Divisional Information (all broadcasts are on Sundays unless otherwise stated).

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Broadcasts— 3570 kHz and 2m Ch. 6 (or 7): 10.00Z.

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President — Mr. A. D. Tilley VK2BAD
Secretary — Ms. S. J. Brown VK2BSB
Broadcasts— **1100 local.** 1.825, 1.8125 (Ncle), 3.595, 7.146, 28.32, 52.1, 52.525, 144.15 MHz, Rptr. Ch. 6650 Oberon, 6750 Gosford, 6800 Lismore, 6850 Wollongong, 7000 Sydney, 8525 Sydney.
1930 local. 52.1, 52.525, 144.15 MHz, Rptr. Ch. 6650 Oberon, 6750 Gosford, 6850 Wollongong, 7000 Sydney, 8525 Sydney, Relays on 160, 80 and 10 metres.
RTTY **0030Z.** 7.045, 14.090, 146.6 MHz. **0130Z.** 21.095 MHz. **0930Z.** 3.545, 146.6 MHz.
Mondays **1930 local.** Newcastle. 3.595 MHz, 10m, Rptr. Ch. 6750 Gosford, 6900 Newcastle.

VIC.:
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Secretary — Mr. J. D. M. Dowie VK3BVE
Broadcasts— 1840, 3600, 7135 kHz — 53.032 AM, 144.2 USB and 2m Ch. 2 (5) repeater: 10.30 local time.
Gen. Mtg. — 2nd Wed., 20.00.

QLD.:
President — Mr. A. J. Aarsse VK4QA
Secretary — Mr. W. L. Gielis VK4ABG
Broadcasts— 1825, 3580, 7146, 14342, 21175, 28400, kHz; 2m (Ch. 42, 48): 09.00 EST.
Gen. Mtg. — 3rd Friday.

SA:
President — Mr. I. J. Hunt VK5QX
Secretary — Mr. W. M. Wardrop VK5AWM
Broadcasts— 1820, 3550, 7095, 14175 kHz; 21.160 28.5 and 53.1 MHz, 2m (Ch. 8): 09.00 S.A.T.
Gen. Mtg. — 4th Tuesday, 19.30.

WA:
President — Mr. B. Hedland Thomas VK6OO
Secretary — Mr. Peter Savage VK6NCP.
Broadcasts— 3560, 7075, 14100, 14175 kHz. 28.47, 53.1 MHz. 2 metres Ch. 2 Perth, Ch. 6 Wagin. Time 0130Z.
Gen. Mtg. — 3rd Tuesday.

TAS.:
President — Mr. R. Emmett VK7KK
Secretary — Mr. B. J. Morgan VK7RR
Broadcasts— 7130 (SSB) kHz with relays on 6 and 2m Ch. 2 (S), Ch. 8 (N), Ch. 3 (NW), 09.30 EST.

NT:
President — Mr. T. A. Hine VK8NTA
Vice-Pres. — Barry Burns VK8DI
Secretary — Robert Milliken VK8NRM
Broadcasts— Relay of VK5WI on 3.555 MHz and on 146.5 MHz at 2330Z. Slow morse transmission by VK8HA on 3.555 MHz at 1000Z almost every day.

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VK2 — 14 Atchison St., Crows Nest, 2065 (Ph. (02) 43 5795 Tues & Thurs 9.45-13.45h).
P.O. Box 123, St. Leonards, NSW 2065.
VK3 — 412 Brunswick St., Fitzroy, 3065 (Ph. (03) 41 7535 Weekdays 10.00-15.00h).
VK4 — G.P.O. Box 638, Brisbane, 4001.
VK5 — G.P.O. Box 1234, Adelaide, 5001 — HQ at West Thebarton Rd., Thebarton.
VK6 — G.P.O. Box N1002, Perth, 6001.
VK7 — P.O. Box 1010, Launceston, 7250.
VK8 — (incl. with VK5), Darwin AR Club, P.O. Box 37317, Winnellie, N.T., 5789.

Slow morse transmissions — most week-day evenings about 09.30Z onwards around 3550 kHz.

VK QSL BUREAUX
The following is the official list of VK QSL Bureaux, all are inwards and outwards unless otherwise stated.

VK1 — QSL Officer, G.P.O. Box 46, Canberra, A.C.T. 2600.
VK2 — QSL Bureau, C/- Hunter Branch, P.O. Teralba, N.S.W. 2284.
VK3 — Inwards QSL Bureau, Mrs. B. Gray VK3BYK, 1 Amery Street, Ashburton, Vic. 3147.
VK3 — Outwards QSL Bureau, Mr. R. R. Prowse VK3XY, 83 Brewer Road, Bentleigh, Vic. 3204.
VK4 — QSL Officer, G.P.O. Box 638, Brisbane, Qld., 4001
VK5 — QSL Bureau, Mr. Ray Dobson VK5DI, 16 Howden Road, Fulham, S.A. 5024.
VK6 — QSL Bureau, Mr. J. Rumble VK6RU, G.P.O. Box F319, Perth, W.A. 6001.
VK7 — QSL Bureau, G.P.O. Box 371D, Hobart, Tas. 7001.
VK8 — QSL Bureau, C/- VK8HA, P.O. Box 1418, Darwin, N.T. 5794.
VK9, 0 — Federal QSL Bureau, Mr. N. R. Penfold VK6NE, 388 Huntriss Rd., Woodlands, W.A. 6018.

WIANEWS

DRAFT AUSTRALIAN TABLE OF FREQUENCY ALLOCATIONS

Elsewhere in this issue the Institute's submission to the Committee handling the table is published. Hopefully a large number of amateurs have also individually completed and posted a submission to DOC as suggested by the special insert into February AR.

NEW LEGISLATION

It now seems likely that the Federal Government will introduce legislation to replace the present Wireless Telegraphy Act, 1905-1980 later this year.

The Department of Communications has developed a draft set of principles as a basis, it suggests, for such a new Act. The Institute has been asked to comment both in the context of these principles, and generally as to the new legislation. A very short time, some three weeks, was allowed for these comments. The Executive has agreed to a general position, and this has been put to the Department in a submission prepared by Michael Owen VK3KI.

Most Bills for an Act of Parliament are passed by the House of Representatives and the Senate fairly quickly and become law soon after their passage through Parliament. However in this case the Department has indicated that after the Bill has been introduced, it is likely that time will be allowed for public comment before the Bill is debated by Parliament.

The present Wireless Telegraphy Act has certain very broad and general provisions but really leaves most matters to be covered by Regulations made under the Act. It can be expected that a new Act will deal with many more matters affecting radio communications than the present Act though, of course, detailed matters will still be dealt with by Regulation made under the new Act.

As the primary law to govern radio communications, other than broadcasting and television, will be set out in this Act, it will be of considerable importance to amateurs. It is particularly important that restrictions that may be seen as appropriate for some users of the frequency spectrum but are not appropriate for other users such as amateurs, are not indiscriminately applied to all users.

6 METRE BAND

Members will have noted comments about the proposals for the 6 metre band in the draft Australian table. However, a letter was received from the Department of Communications during December refusing to grant amateurs the use of the 50-50.15 MHz segment of the present ITU R3 allocation.

The decisions of the WARC take effect from 1.1.1982 and presumably the objective of the Department of Communications will be to finalise, at least as far as practicable, the Australian Table of Frequency Allocations by that date.

The Institute has pressed for the immediate availability on a non-interference basis of the band segment 50-52 MHz or at least the window 50-50.15 MHz pending implementation of the new Australian Table. The use of 50-50.15 MHz is proving an extremely difficult nut to crack.

PORTABLE REPEATERS

In letter RB4/4/29 the DOC informed the Institute that it is prepared to authorise portable repeater stations to be operated by the WICEN network in the 2m and 70 cm bands subject to the following conditions —

"1. Prior approval is not required where an approved portable repeater is to be put into operation as part of a declared Civil Emergency which is under control of the controlling authority for the emergency at the time. Notifications of the use of the portable repeater and its location should be given to the Department at the earliest opportunity.

2. The portable repeater shall operate on a nominated pair of frequencies selected by the WIA and acceptable to the Department.

3. The portable repeater shall not, unless special circumstances exist, be used to provide fixed linking to other established repeater stations. If it is used for this purpose, the Department should be informed of the circumstances at the earliest opportunity.

4. Prior approval is required where the portable repeater is to be used in WICEN exercises in accordance with the general provisions of the Amateur Operators Handbook (Dec. 78), Paragraphs 6.28 to 6.33 inclusive. Advice of preferred repeater sites should be given to the Department to enable preliminary calculations of interference to be made and their suitability to be assessed in association with the proposed frequency of operation.

5. The WIA State Division accept full responsibility for the proper operation of the portable repeater.

It is appreciated that it would be difficult to fully comply with the technical provisions of the Handbook in respect to a portable repeater. It would be expected however, that the technical provisions of Paragraph 5.11 (a) (b) (c) (e) (j) and (M) be complied with."

The Institute has replied that the conditions are acceptable in principle subject to later comment, if any, from individual Divisions.

WIA 75th ANNIVERSARY

The Federal President has asked Divisional Presidents to say what, if anything, should be done to mark the Institute's 75th anniversary in 1985. If anything is to be done, preparations should begin soon. Let your Divisional Council have your views; there is no shortage of good ideas, however. Probably one fundamental to be followed will be the desire to bring amateur radio to the attention of the general public so as to counter ignorance and even ill-will.

Application has been made to Australia Post for the issue of a commemorative pre-stamped envelope for the occasion. In reply Australia Post advised that amateur radio has now been added to the list of potential subjects. The strict criteria which apply have at this time excluded the issue of a special postage stamp according to Australia Post rules.

GENERAL

At the January meeting the Executive agreed to Peter Mill VK3ZPP, acting as Chairman of the Federal Repeater Sub-Committee during the absence overseas of Ken Seddon VK3ACS.

Discussions were held about a proposed National Convention and the assistance which the Institute could provide to any Club or Group organising or involved in such a future event.

It was reported that the DOC intended to revise the conditions under which "C" calls are granted and retained.

Bill Rice VK3ABP has agreed to take over the chairmanship of the Federal VHF/UHF Advisory Committee.

FEDERAL CONVENTION

An Agenda Item for the 1981 Federal Convention proposes a discussion about "phone-patch". Another Agenda Item may propose discussions about future planning for the amateur service in Australia. Another will seek discussions on the eligibility of a worthy cause (e.g. WICEN) as a reason to apply for a Federal Government Grant-in-Aid. It is known that others are in the pipe-line and hopefully will be received in time for inclusion in April AR. One of these could be the re-activation of discussions on affiliation by Australia-wide specialist amateur organisations.

If you consider this issue of AR is short on technical articles, it is because there is a sudden surge of important news and policy items which you, as a member, should know about in detail. ■

Wireless Institute of Australia

Draft Australian Table of Frequency Allocations

Comment submitted on behalf of the Amateur Service

1. **INTRODUCTION**

These comments are in response to the draft for public comment released by the Department of Communications of the proposed Australian Table of Frequency Allocations.

In making these comments the Institute is conscious of the competing claims for radio spectrum by different Services. It also bears in mind the absence of policy decisions relating, in particular, to broadcasting. In certain parts of the spectrum the Institute supports or makes proposals designed to allow a long term flexibility, at least pending these policy decisions.

The Institute has given wide publicity to the draft Table, through broadcasts originating in each State and through the circulation of written material and publication of information in its magazne. In adopting the position that it does, it believes that it has the support of amateurs generally.

In general the draft Table is supported by the Amateur Service. Accordingly, where no particular issue is perceived, a number of bands and footnotes are not specifically adverted to. It is to be understood that in these cases the draft proposals are supported.

2. **1800-1825 AND 1825-1876 kHz**

These proposals are strongly supported.

3. **3500-3700 kHz**

In Australia the band 3500-3700 kHz has been allocated exclusively to the Amateur Service and the band 3700-3900 kHz to the Fixed and Mobile Service, though the Region 3 allocation is to all three Services on a shared basis. It is recognised that Australia asserts a particular requirement for Fixed and Mobile operation in this part of the spectrum, particularly having regard to propagation characteristics in tropical areas. No doubt the continuation of the present position is advantageous in terms of frequency management. However, one consequence of the present position is that Australian Amateurs are restricted in their ability to communicate internationally on this band. For example, US Amateurs are not permitted to use telephony below 3775 kHz. Accordingly, the Institute proposes a small window of say 10 kHz at around 3800 kHz to meet this need.

4. **7000-7150 AND 7150-7300 kHz**

The draft Table proposes the new allocation of the band 7150-7300 on a secondary basis to the Amateur Service subject to AUS 115. The Institute strongly supports this proposal. Quite apart from the obligation imposed by No. 342 of the Radio Regulations on the Amateur Service in this band, the relative power of broadcasting stations is such that the possibility of harmful interference is almost negligible. New Zealand Amateurs currently enjoy the same privilege in this part of the spectrum and the New Zealand experience indicates no difficulty with the Amateur Service sharing on a secondary basis with broadcasting. The expansion of the band will be of particular value during daylight hours when, in general terms, propagation characteristics effectively restrict communication to the Australian area.

5. **THE NEW BANDS 10100-10150, 18068-18168 AND 24890-24990 kHz**

The Amateur Service welcomes the inclusion of these new bands in the proposed Australian Table, reflecting the decisions of the World Administrative Radio Conference 1979. However, it is concerned as to the timing proposed in the draft as to the availability of these bands for the Amateur Service. It is convenient to deal with the considerations affecting all three bands together, although the considerations are not necessarily identical.

The band 10100-10150 kHz is a secondary allocation and is not subject to any transitional procedure. Accordingly, so far as the decisions of the WARC are concerned, that band will be made available from the coming into force of the Final Acts of the Conference. The Institute is concerned that because of the narrowness of this band (in fact half the width proposed by Australia in its proposals to the WARC), considerable congestion will occur. This can be ameliorated by the making available of all three bands simultaneously. This is clearly permitted, subject to No. 342 of the Radio Regulations, and would appear to be quite practicable as the Institute observes that little use is apparently made of the two higher bands in Australia.

It is also noted that the proposed footnote AUS 112 is almost meaningless. It provides that the use by the Fixed Service of this band "will be limited". Limited by whom? And in what respect? The Amateur Service believes that in respect of the band 10100-10150 kHz assignments to the Fixed Service should be withdrawn as soon as practicable and no new assignments should be made in that band. This is consistent with the Australian proposal to the WARC (which was to propose an exclusive band for the Amateur Service in this part of the spectrum) and has the considerable advantage of avoiding the possibility of harmful interference to stations in the Fixed Service in Australia. Of course, so far as other Administrations are concerned, Australian Amateur stations will retain secondary status.

Accordingly, the Institute proposes the recasting of the footnoes AUS 112 and AUS 113 as follows:—

"AUS 112

No new assignments to the Fixed Service other than to meet urgent operational requirements shall be made in this band, though in any event all assignments shall be withdrawn by the 1st July, 1984. Use of this band by the Amateur Service shall be permitted from 1st January, 1982."

"AUS 113

No new assignments shall be made to the Fixed Service in the band 18068-18168 kHz or to the Fixed and Land Mobile Services in the band 24890-24990 kHz other than to meet urgent operational requirements, though in any event all assignments shall be withdrawn in these bands by 1st July, 1984. Use of these bands by the Amateur Service shall be permitted from 1st January, 1982, however, such use shall be subject to the condition of No. 342 of the Radio Regulations until 1st July, 1984."

6. **50-52 MHz**

The draft Table proposes the allocation of this band to the Amateur Service on a secondary basis to broadcasting. The Institute strongly supports this proposal. In Region 3 the band 50-54 MHz is allocated to the Amateur Service, as is the case in Region 2. There are many parts of Australia where operation is possible on this vital international band without any possibility of the amateur station causing harmful interference to television reception. Again, because of the relative power of television broadcasting stations, an amateur station operating in this part of the spectrum will be aware of propagation conditions that at any particular time could

give rise to the possibility of harmful interference and given the secondary status of the Amateur Service, that possibility can be avoided. It is also noted that even in areas served by television stations operating in this part of the spectrum, there are times of the day when these stations are not operating and the possibility of amateur communication should not be excluded.

7. **576-585 MHz**

At present the Australian footnote 59 provides that this band is allocated to the Amateur Service "until required by the Broadcasting Service". At present the band is extensively used, particularly for Amateur television repeaters. It is not clear whether the omission of this footnote from the proposed Table was intentional or an oversight. However, given the extensive use of the band at present, and having regard to the wording of the existing foonote, the Institute can see no reason why that footnote should not be retained.

8. **2300-2450 MHz**

The proposed Australian Table allocates this band on a primary basis to Fixed Mobile and Radiolocation and to the Amateur Service on a secondary basis. However, the sub-band 240--2450 MHz is subject to footnote 664 which permits operation in that band by the Amateur Satellite Service subject to that Service not causing harmful interference to other services operating in accordance with the Table. That footnote is of world-wide effect. In the circumstances the Institute would propose that at least in the band 2400-2450 MHz the Fixed, Mobile and Radiolocation Services should be excluded.

9. **CONCLUSION**

In response to the draft the Institute:—

1. Strongly supports the changes proposed in the band 1800-1875 kHz.
2. Proposes a small sub-band of say 10 kHz at about 3800 kHz.
3. Strongly supports the changes proposed in the band 7150-7300 kHz.
4. Urges the relocation of any Fixed Service assignments in the band 10100-10150 kHz, proposes the availability of that band and the bands 18068-18168 and 24890-24990 kHz to the Amateur Service from the 1st January, 1982, and to these ends proposes new footnotes AUS 112 and AUS 113.
5. Strongly supports the changes proposed in the band 50-52 MHz.
6. Proposes retention of the existing Australian footnote 59 in respect of the band 576-585 MHz.
7. Proposes that in the sub-band 2400-2450 MHz in the band 2300-2450 MHz that Fixed, Mobile and Radiolocation be deleted.
8. Otherwise supports the proposed Australian Table of Frequency Allocations. ■

10 Commandments of a Repeater

1. Thou shalt give way to stations with emergencies and assist in all ways that station.
2. Thou shalt listen before thou transmitteth to be sure that ye have not smitten another's signal.
3. Thou shalt partake of the conversations at hand and thou shalt not disrupt the orderly flow thereof.
4. Thou shalt desist thy transmission when the voice of thy signal is weaketh and thou shalt refresh thy batteries before renewing.
5. Thou shalt not commit doubling and shalt insureth that ye truly have it by lifting thy PTT button and listeningeth.
6. Thou shalt not smitten another's signal intentionally lest he smitten you on the nose in return.
7. Thou shalt not killeth the repeater by allowing the wind of thy signal to exceedeth the great timer on the hill.
8. Thou shalt cleanseth thy signal of impurities and keepeth thy signal on the frequency and bandpass lest thou spilleth over onto adjacent repeaters.
9. Thou shalt await the duration of the beep for the breaker to deserveth his chance.
10. Thou shalt honor the wishes of the Great Pumpkin for his is the presence that maketh the big machine go.

From Sine of the Times Newsletter ICARC ■

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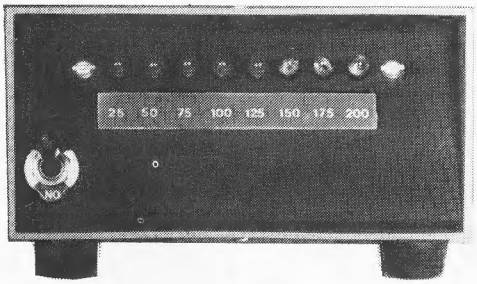

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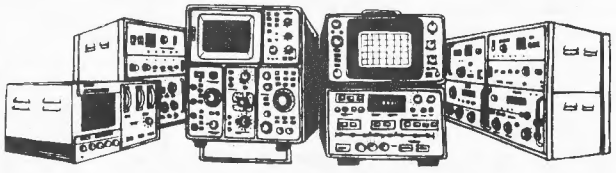

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A Review of Antenna Noise Bridges Part 1

Bob Slutzkin VK3SK
8 Lynedoch Ave., Balaclava 3183

It is the intention of this article to highlight the main variation in design of the noise bridges that have been described in the literature or in sales data, to point out features that have a bearing on accuracy and reliability, and to discuss some of the limitations of noise bridges. Of more importance, it is hoped that this article might stimulate a wider interest in antenna impedance measurements, and perhaps encourage radio amateurs to look more deeply into the mathematics of impedance and the various ways that it can be expressed.

INTRODUCTION

The noise bridge is an Amateur Radio device. It was invented by a radio amateur, was further developed by radio amateurs; and like the grid dip oscillator, is almost exclusively used by radio amateurs.

Many variations on the original by W5QJR have appeared in amateur radio journals; and the article by W6BXI and W6NKU in the February 1977 edition of Ham Radio shows that a noise bridge capable of measuring both R and X to an accuracy approaching that from expensive professional instruments is within the reach of any of us who are interested in serious impedance measurements. That article triggered off quite a reaction amongst a few enthusiasts, and started off a search for noise bridges with higher reliability and accuracy, and that would reach up into the higher frequency bands. The search is still continuing.

BACKGROUND

RF bridges are used for the measurement of impedance of networks, antenna systems and components. Because the impedance of anything is likely to be different at different frequencies, it is necessary to include in a statement of the impedance of a device, the exact frequency at which it applies. Before the advent of noise bridges, RF bridges were energised by a signal generator, the calibrations of which defined the frequency of measurement. Balance was indicated by a null detector, such as an RF millivoltmeter with perhaps a single tuned circuit for added sensitivity. In some professional bridges the signal generator and null detector are part of the instrument, whilst others rely on the use of separate external source and detector; it is not uncommon practice in laboratories for a communications receiver to be used as a sensitive null detector for an RF bridge. In hindsight, it is surprising that it took so long for someone like W5QJR to come up with the idea of energising an RF bridge with a broad-band signal, and utilising the frequency calibration and selectivity of a communications receiver to control the frequency of measurement. That is the secret of the noise bridge. A broad-band noise source energises the bridge circuit, whilst a receiver is the frequency selecting null detector. A zener noise generator, broad-band amplifier and battery occupy so little space that they can be encased with the bridge circuitry to make a compact and handy instrument. Designed for coax. fed antenna systems, noise bridges are fitted with a coax. connector for the antenna to be measured and one for feeding the receiver.

NOISE BRIDGE TYPES

1. R Bridges

W5QJR (R. T. Hart) demonstrated his ingenuity and also his wisdom when he described in QST, December 1967, the Omega-T model TE7-01 noise bridge which he had invented. He could have made a bridge which would measure both resistance and reactance, as was mentioned in his article, but he realised that the majority of radio amateurs would aim at tuning their antenna systems to resonance and would prefer an R bridge which is simpler to operate and understand — a bridge which measures resistance only, and clearly indicates resonance. This seemed to set the pattern, and quite a succession of R type noise bridges followed before R-X bridges began to appear. Circuit details of the TE7-01 are shown in Fig. 1a.

WB2EGZ (Don Nelson) described an R type noise bridge for home construction

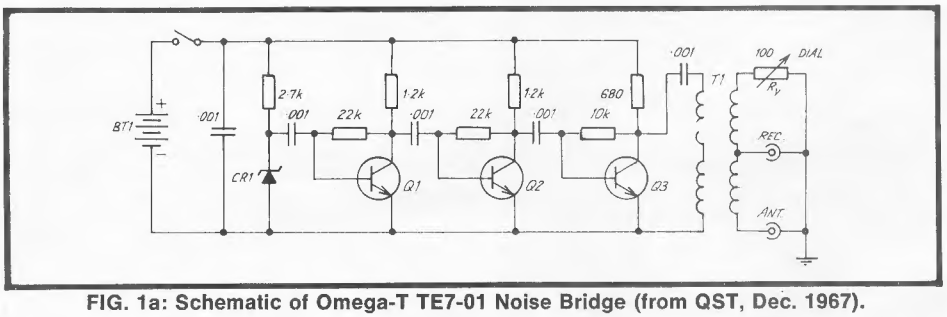

FIG. 1a: Schematic of Omega-T TE7-01 Noise Bridge (from QST, Dec. 1967).

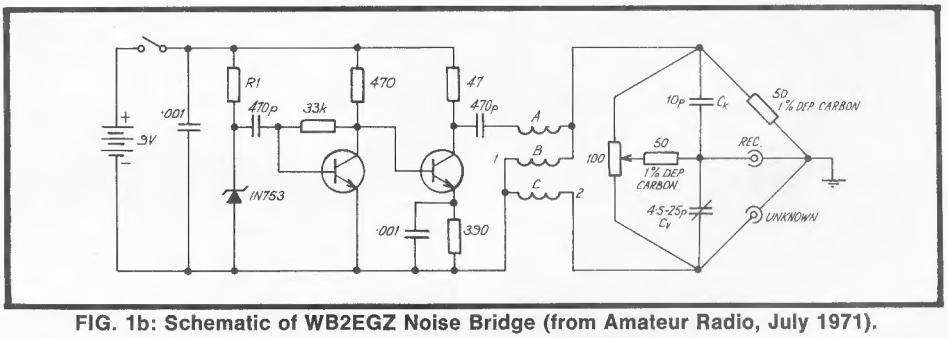

FIG. 1b: Schematic of WB2EGZ Noise Bridge (from Amateur Radio, July 1971).

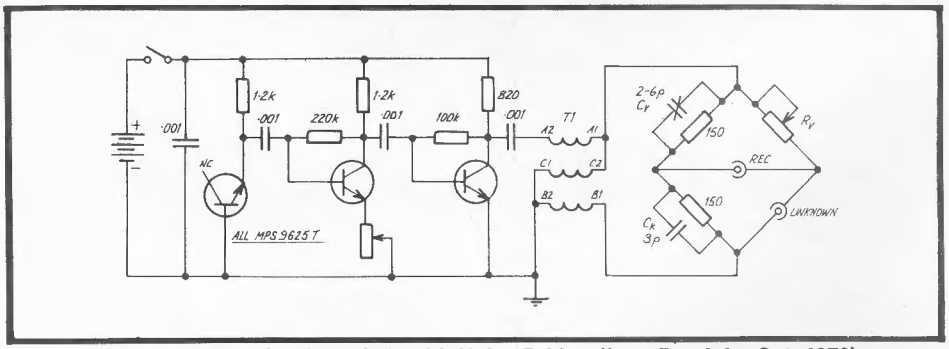

FIG. 1c: Schematic of the Galbraith Noise Bridge (from Break-In, Oct. 1972).

in Ham Radio, December 1970. His article was reprinted in Amateur Radio, July 1971, and in Amateur Radio, October 1971. VK5NN (Phil Williams) wrote some construction tips and suggested modifications. Then ZL2AMJ (Fred Johnson) described the updated version in Break-In, May 1972, of course giving credit to Don and Phil. Reference was made to this bridge in Radio Communications, and it was later written up in Pat Hawker's Amateur Radio Techniques and called the ZL2AMJ noise bridge. So WB2EGZ's bridge certainly received a lot of attention. Fig. 1b shows the circuit details. The Omega-T Model TE7-02 (extended range bridge) has a similar bridge circuit, but details of its balun are not available to me.

"The Galbraith Bridge" was the name given to a noise bridge which was developed by the Projects Group of the NZART, Christchurch Branch, for production as a kit set. In Break-In, October 1972, ZL3AAY(Tony Bowie) described it and gave the circuit details shown in Fig. 1c.

2. R-X Bridges

Add one fixed and one variable capacitor to an R bridge and you have an R-X bridge which can measure the complex impedance of an antenna at frequencies other than resonance. The Editors and Engineers Radio Handbook describes series and parallel R-X bridges, but other examples will be covered here.

(a) Series R-X Bridges: The commercially available Palomar and the MFJ 202 are series R-X bridges not far different from the one in the handbook. The Palomar circuit with a notation indicating the main differences in the MFJ 202 is shown in Fig. 1d.

(b) Parallel R-X Bridges: YA1GJM (G. Pappot) in Ham Radio, January 1973, described a parallel R-X bridge on which W6BXI (Bob Hubbs) and W6NKU (Frank Doting) based their famous Ham Radio, February 1977, article on an improved noise bridge, describing important measures to improve the accuracy and extend the range. Circuit details are shown in Fig. 1e.

Any R-X bridge may be used as an R bridge if the X dial has been properly set at zero and left at that setting. The discussions that follow on R bridges may be applied, therefore, to R-X bridges set in this fashion.

NOTES:

1. R1 — Choose suitable value for best noise output (approx. 2200 ohms).
2. Transistors — 2N918, 2N553, or HEP 56.
3. 0.375 OD toroid form, Indiana general of 102, core material 03.

ACCURACY AND RELATED CONSIDERATIONS

The Basics of Accuracy

These bridges are adaptations of the Wheatstone bridge, renowned for accuracy and reliability. Fig. 2 shows the general circuit of a Wheatstone DC bridge. (I call R_1 and R_2 the "ratio resistors" and R_4 the "reference resistor". R_3 is the unknown.) In one form, the ratio resistors are an accurately matched pair, and the reference is a calibrated resistance box. I call this type "an equal ratio bridge". In another form, the ratio resistors comprise the two arms of a potentiometer, and the reference is a resistor of known accurate value. I call this type "a variable ratio bridge"

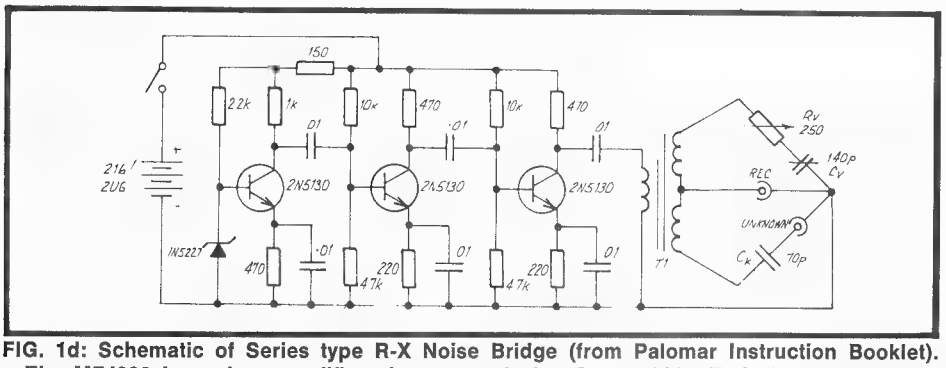

FIG. 1d: Schematic of Series type R-X Noise Bridge (from Palomar Instruction Booklet). The MFJ202 has minor amplifier changes and also Cw = 300 pF, & Ck = 150 pF.

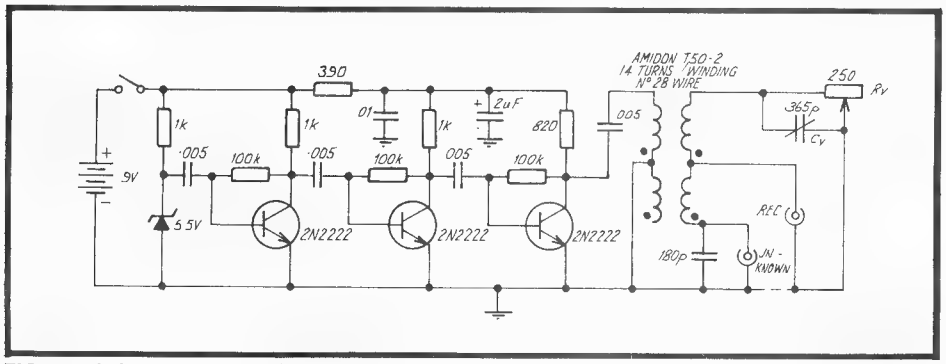

FIG. 1e: Schematic of W6BXI W6NKU Parallel R-X Noise Bridge (from Ham Radio, Feb. 77).

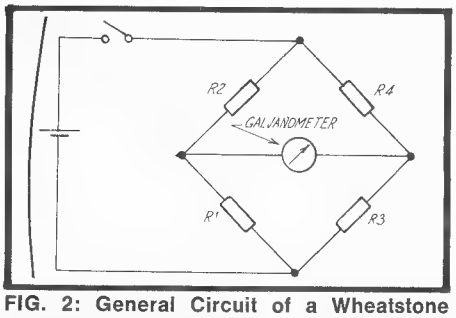

FIG. 2: General Circuit of a Wheatstone Bridge. R1 and R2 are the ratio resistors; R3 is the unknown resistor; R4 is the reference resistor.

A measurement is made on either type by adjusting the variable until the galvanometer indicates a null, at which stage the bridge is said to be balanced. The value of the unknown is then determined from the equation:

$$R_1/R_2 = R_3/R_4$$

In the equal ratio bridge, the value of the unknown is read from the dials of the reference; whilst in the variable ratio bridge, it is the known value of the reference, multiplied by the ratio.

For these bridges to be accurate:

1. The component parts must be accurate and stable, and the instrument accurately calibrated;
2. The condition of balance must be established accurately; and
3. The dial or dials of the bridge must be read accurately.

Inaccuracies may occur as a result of inaccuracies or errors in these three areas. To demonstrate this, let us look at an experimental bridge that might be made up in any amateur radio shack.

This imaginary bridge is the same as the circuit in Fig. 2. Suppose R_1 and R_2 are 100 ohm 5 per cent composition resistors, R_3 is the unknown, R_4 is a 250 ohm linear composition potentiometer, and for the galvanometer, the station multimeter is used. The potentiometer is mounted on a small panel on which a scale has been marked into ten equal divisions of the potentiometer's angular range, to cover 25 ohms per division, and a small instrument knob is attached. The station key (not a bug or electronic type) and any old battery are connected up to complete the bridge, which can now be used for the measurement of resistance in the range of 0 to 250 ohms.

The accuracy of this bridge would be poor because:—

(a) The ratio resistors could introduce an error of ± 10 per cent.
(b) The graduation of the potentiometer could be another 10 per cent out.
(c) Parallax errors could be in the order of 10 ohms.
(d) It may be difficult to establish the balance to closer than 2 per cent accuracy.

We could greatly improve this bridge by taking steps to accurately match the ratio resistors, using a proper dial with low

parallax, and by calibrating the potentiometer. It would be even better to calibrate the completed bridge directly on to the new dial, against an accurate resistance box. This would take care of the errors in the ratio resistors and the potentiometer in one shot.

This was not a frivolous example. It shows how errors in the order of 25 per cent could occur in a *DC bridge* as a result of the components and techniques that are used in some noise bridges, and how these can be reduced substantially. Noise bridges, as will now be explained, have their own special problems, which if not properly dealt with can *add* to the measurement errors just discussed.

BALANCING THE NOISE BRIDGE AND ERRORS IN BALANCE

The operation of balancing the noise bridge is a little more complicated than that of balancing a DC bridge. The R type bridge is balanced by simultaneously varying the variable component of the bridge and the receiver tuning until a sharp null is produced in the receiver's noise output. If the unknown is a pure resistance, the receiver tuning will have no effect on the balance, but if it is an antenna system, balance will occur when the receiver is tuned to the resonant frequency of the antenna system (meaning the antenna plus its feed-line), and the bridge is set to the impedance at resonance. The same procedure applies to an R-X bridge when the X control is set and left to its zero position, as it is then effectively an R bridge. (The R-X bridge is intended for the measurement of the complex impedance of antenna systems at any frequency. The receiver may therefore be set to the desired frequency, and balance obtained by simultaneously varying the R and X controls. The R and X values may then be obtained from the formula that would apply to the particular bridge. This will be discussed later.)

The R bridge can measure the impedance at resonance of an antenna system, only if the resonant frequency falls within the range of the receiver, and if the impedance is within the range of the bridge. (Similarly, an R-X bridge can measure complex impedances only if both R and X values are within the range of the bridge.)

To see more clearly what happens when a noise bridge is being balanced, and where errors in balance can occur consider the following example.

Assume a perfect, equal ratio, R type noise bridge, perfectly balanced when measuring a 50 ohm dummy load. The operator would have set the receiver to any frequency, and then adjusted the variable reference until a sharp deep null appeared in the noise output of the receiver, and would have then checked that any slightest movement of the dial on the bridge would have cause a re-appearance of the noise. Fig. 3a shows a typical graph of the receiver noise output variation with changes in potentiometer setting.

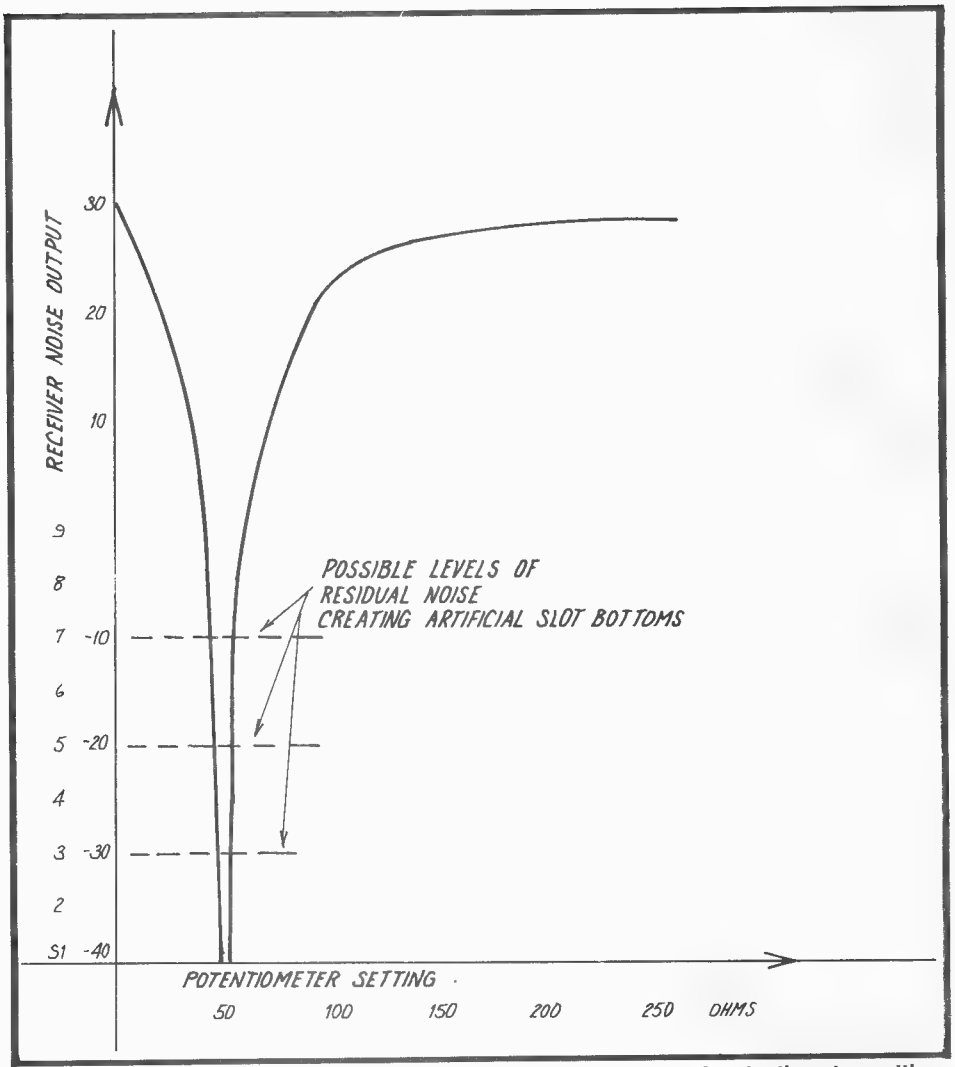

FIG. 3a: Graph showing receiver noise output over the range of potentiometer settings in a noise bridge measuring a 50 ohm resistance.

As a second example, assume the bridge has been again perfectly balanced when measuring the impedance of an antenna resonant at 14.2 MHz with an impedance of 50 ohms (the antenna is assumed to be entirely free from noise or signal pick-up). This time the operator would have adjusted the reference potentiometer and the receiver dial simultaneously to obtain that sharp deep null; and then he would have checked that any movement of either dial would cause a re-appearance of the noise. With the receiver tuning constant at that resonant setting, the graph in Fig. 3a would still be valid for the noise output vs. potentiometer setting. The graph in Fig. 3b shows the variation of noise output from the bridge (when balanced in this manner) over the HF spectrum.

In both graphs the depth of the slot is infinite, where its width is absolute zero, this being a theoretically perfect case.

The practical situation will not be perfect. Apart from other possible imperfections, residual noise will tend to fill the slot. In the graphs of Fig. 3, it can be seen that if the slot were to become partly filled with noise, an artificial slot bottom of finite width would be created, and this width would increase as the level of residual noise increased. Of course, as the slot bottom widens, the setting for balance becomes more uncertain, increasing the likelihood of balance error.

The possible causes of residual noise are discussed briefly in the appendix. They are:

Noise (or signals) from the antenna under test,
Basic receiver noise,
Receiver intermodulation,
Receiver spurious response,
Leakage around the bridge.

Consequently, the receiver's performance is important if accurate measurements are required. Antenna noise might be the most difficult residual problem to handle, and if too severe, the bridge could be unusable at times in some locations. A noise bridge with a strong healthy noise source (such as the TE7-01 with its S9 + 30 noise over the whole HF spectrum) can handle most noisy situations, but can overload some receivers unless an attenuator is used.

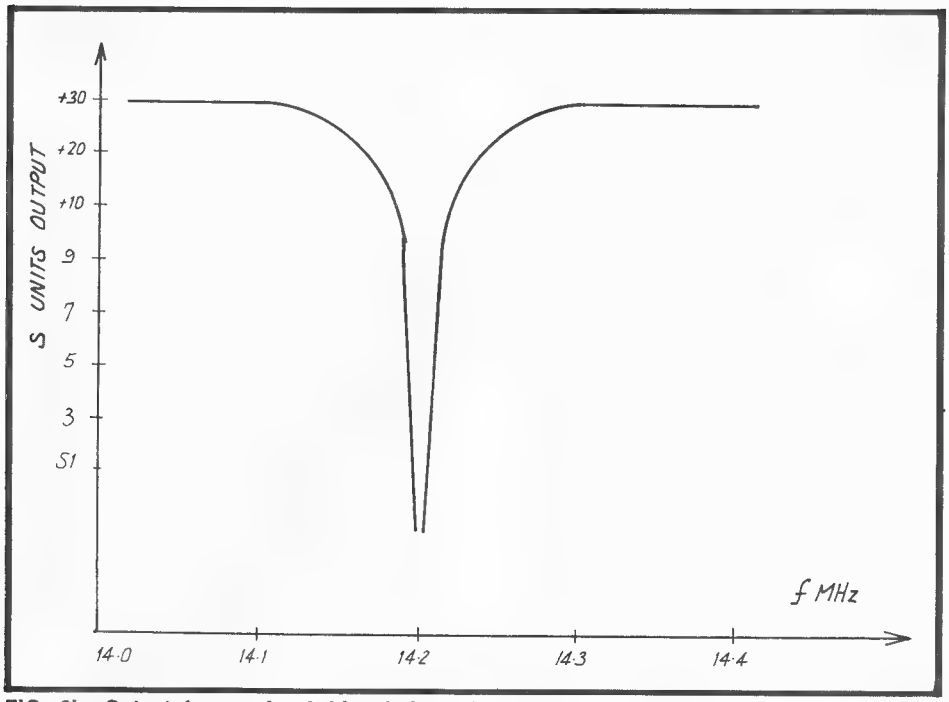

FIG. 3b: Output from noise bridge balanced against an antenna resonant at 14.2 MHz.

ERRORS FROM BRIDGE COMPONENTS

For RF bridges, the equation for balance becomes:

$$Z_1/Z_2 = Z_3/Z_4$$

and each Z may contain resistance and reactance, so the equation, in its general form is:

$$\frac{R_1 + jX_1}{R_2 + jX_2} = \frac{R_3 + jX_3}{R_4 + jX_4}$$

The equal ratio bridge must therefore have $(R_1 + jX_1)$ and $(R_2 + jX_2)$ equal; and this must hold over the frequency range of the bridge. Two exactly equal impedances, such as these, connected in series across an RF source will have voltage drops which are equal and in phase. Any circuit which can produce this voltage and phase relationship, therefore, will be the equivalent of an equal ratio circuit. Most noise bridges employ a centre-tapped transformer to provide this equal ratio circuit.

In the TE7-01, the transformer is quadrifilar wound on a ferrite torroidal core connected to form centre-taps in both primary and secondary, as shown in Fig. 4a. W5QJR claims that "This technique assures a high accuracy centre-tap on the secondary winding, and assures good capacity balance". The Palomar and MFJ bridges use a trifilar wound torroid as shown in Fig. 4b, and which would not appear to be significantly different in regard to capacitive balance; but it took W6BXI and W6NKU to suggest that the capacity between the "files" could introduce unbalance between primary and secondary, and their circuit in Fig. 4c would be likely to produce better ratios over a wider spectrum. They also introduced electrostatic shielding between amplifier and transformer, a sensible precaution considering the frequencies involved; and they devised a simple but ingenious method of fine reactance adjustment by varying the length of leads to the secondary. All this is covered in their article, Ham Radio, February 1977, in which they showed that just a few mm change in lead length is all that is needed to equalise the bridge for a 3-30 MHz band. This is an enlightening and spectacular little experiment recommended to all noise bridge enthusiasts. (The possible stray capacitances in the transformer circuits are indicated in Fig. 4 by broken lines.)

The balun arrangement used in the other two bridges, and shown in Fig. 4d, is of the type that was described by W2IMU in QST, April 1969 (and by the same author in an earlier addition, and by others to whom he referred). This balun is claimed to have a bandwidth of at least 10 : 1 over a large impedance range. Although I have not studied the balun in depth, I think it should be better than the transformer because it should provide a floating output which is well isolated from the input and from earth. If the two resistors in the Galbraith bridge are carefully matched, and due care taken in the layout, then, I feel, an accurate 1 : 1 ratio over an even wider spectrum should be the result. In fact, the two balancing capacitors might be unnecessary, unless their real purpose is to balance out reactance in other parts of the bridge.

In the equal ratio bridges, the reference resistors are composition potentiometers. In previous paragraphs, examples were given of a potentiometer used in a DC bridge, to indicate the effects of graduation, resetting and reading errors that might occur in such an arrangement. Of course these errors would also apply when

FIG. 4: Output arrangements of 4 various noise bridges showing winding method. (Inter-winding capacity shown with broken lines).

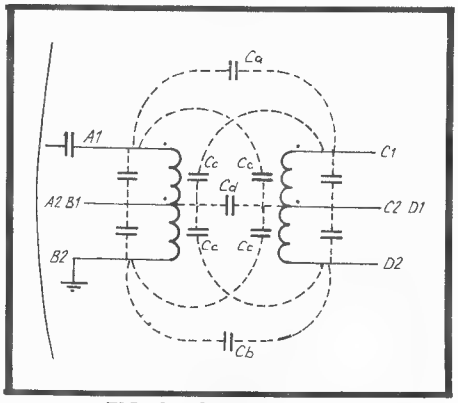

FIG. 4a: Omega-T TE70.

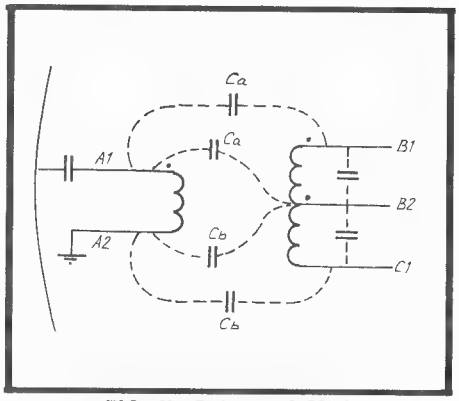

FIG. 4b: Palomar & MFJ.

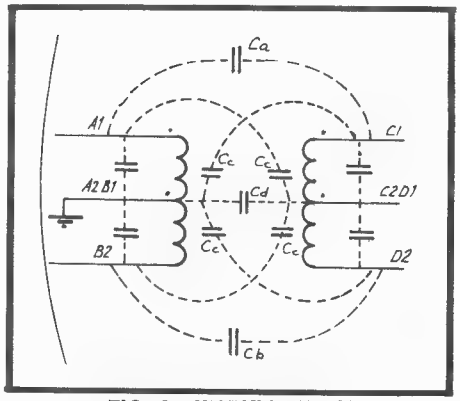

FIG. 4c: W6BXI/W6NKU.

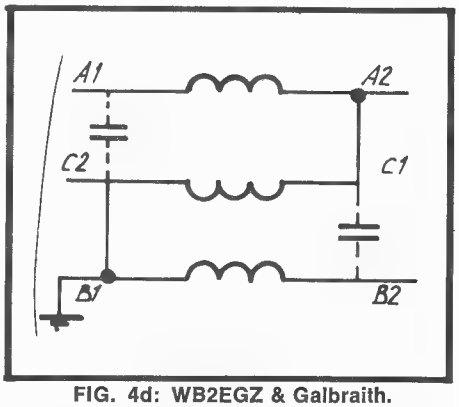

FIG. 4d: WB2EGZ & Galbraith.

a potentiometer is similarly used in a noise bridge; but in addition, the effects of reactance will need to be considered. In the Appendix, the performance of composition potentiometers at RF is discussed. It is shown that they appear to be inductively reactive at settings below 130 ohms (approximately), capacitively reactive at settings above that value, and are non-reactive over a wide band of frequencies at one magical setting close to 130 ohms. A theoretical explanation for this phenomenon is also given in the Appendix.

Variable ratio bridges (such as the WB2EGZ and TE7-02) use a composition potentiometer across the balun to form the ratio resistors. The effects of strays in a potentiometer used in this manner have not been measured; but the other measurements which were made would suggest that the strays would balance out when the potentiometer is in the central position, where each arm would be expected to contain approximately equal resistance, inductance and capacitance. As a consequence, these bridges would be expected to be excellent when measuring non-reactive unknowns equal to the reference resistor, which is in this case 50 ohms.

There can be little doubt that at other potentiometer settings, unbalanced reactance would occur; and the resistance-capacitance compensating network between the potentiometers and the receiver should be effective for one only potentiometer setting, whether the potentiometer is 100 ohms as originally described, or of a higher value as in the later circuits.

Thus, in the equal ratio bridges, the ratio might be slightly unbalanced at the higher frequencies, but unwanted reactance is bound to occur for most settings of the variable reference. In the variable ratio bridges, although the reference resistor is most likely to be non-reactive, there can be unwanted reactance in the bridge circuit due to the ratio potentiometer. Irrespective of which arms of the bridge contain unwanted reactance, the effect is the same. If we attempt to balance a bridge when measuring a pure resistance, unwanted reactance will tend to prevent a complete null; of course large measurement errors can occur if the reactance value is great. If we attempt to balance the bridge when measuring a resonant device, such as an antenna system, *the reactance will not prevent a complete null*, but will cause an error in the measurement of both frequency and impedance, because the *null will occur at slightly different settings of both dials.* The magnitude of these errors will again depend upon the magnitude of the unwanted reactance, but it will also be a function of the Q of the unknown.

IMPROVING PERFORMANCE

Resistance Calibration

Apart from what has already been said about the potentiometer, there might be a problem in calibrating its resistance values at RF. Most opinions are that the resistance of a composition track would remain substantially constant from DC up to above 30 MHz and if this is correct, there is no reason why the potentiometer should not be calibrated at DC for use in a noise bridge. A good quality ohmmeter has been suggested by some as sufficient for the purpose, and perhaps an R-C bridge might be better (depending upon how it had been calibrated). My choice is to calibrate the bridge at RF against a set of dummy loads, as will be discussed shortly.

Minimising R Measurement Errors

Errors in balancing can be minimised by ensuring that the noise source has sufficient output to cope with the noise from the particular antenna under test, and that the receiver is good enough for the job, i.e. one that is well shielded, sensitive, and with good spurious rejection and overload characteristics.

Minimising component-caused errors is perhaps more difficult. However, we can compensate for them over the desired measurement range. If, for example, all that is required is a "go, no-go" indication of resonant 50 ohms, we can calibrate the bridge against a good non-reactive 50 ohm dummy load, adjusting for reactive unbalance by means of compensating capacitors as are used in the Galbraith or WB2EGZ bridges (or if it is an R-X bridge, by fine adjustment of the X dial). If it is found that the compensation does not hold over the HF spectrum, it will be necessary to repeat the compensation each time the frequency band is changed. Many users would not have the need to recompensate, and would be quite satisfied with this arrangement.

If greater accuracy is needed over a range of R values, then a range of dummy loads could be used — say values of 25, 50 and 100 ohms. Perhaps one at 150 ohms and some in-between values would be needed by some enthusiasts. The ARRL Handbook describes how these can be made and some useful information for home-brewers of dummy loads is given in the Appendix. Equipped with a range of dummy loads, we can calibrate a noise bridge at the frequencies and resistance values we need. The compensation would be more likely to require readjustment over a wider range of both R and f values than in the simpler cases, so that the need for the compensation control to be accessible to the outside of the instrument becomes greater in this example.

Direct calibration of the R dial in this manner will help to reduce errors likely from several causes; but repeating an earlier theme: If accurate measurements are needed, *a tiny knob cannot do the job of a proper dial.*

An R type noise bridge, with a good dial, an external compensation control, and carefully calibrated against a set of dummy loads can give reasonably reliable and accurate measurements. If to achieve this, extensive modifications are needed to your existing noise bridge, perhaps you should consider converting it into an R-X bridge.

Accurate R and X Measurements

Naturally the above comments would apply also to the R measurements made on R-X bridges, but the measurement of reactance presents other problems which will be explained. An R-X noise bridge is balanced with the receiver set to a predetermined frequency, and then the R and X dials are simultaneously adjusted for that sharp deep null in the receiver noise output. The dial readings must then be converted into the R + jX form (or to some other parameters if preferred) by use of the appropriate formula for the particular bridge. There are also graphs which can be used in the case of the series bridge for a quick estimate of the X value.

Impedance Range

The accuracy and the range of measurement are interdependent to an extent, because too large a range can cramp the scale to the detriment of accuracy. Too small a range, on the other hand, can reduce the usefulness of the bridge. Because noise bridges are primarily intended for impedance measurements on coaxial lines of 50 to 75 ohm natural impedance with SWRs of up to 2 : 1, this fact might be used to define a desired practical impedance range for noise bridges. From the Smith chart it can be seen that this range would include R values between 25 and 150 ohms, and series X values between 0 and $\pm$56.25 ohms, the parallel equivalent to this being 6.7 to 40 mmhos conductance and 0 to $\pm$ 40 mmhos susceptance or 25 to 150 ohms Rp and $\pm \infty$ to $\pm$ 67 ohms Xp. A noise bridge which can measure this range of impedances accurately and reliably from 3.5 to 30 MHz would be a handy instrument for antenna experimenters. This will be the target in the discussion to follow.

THE ACCURACY OF REACTANCE MEASUREMENTS

The Appendix gives mathematical analyses of the series and parallel type R-X noise bridges with other theoretical matters, including equations for balance, conversion formulae and graphs. The effects of strays and other factors which can contribute to reactance measurement errors are also discussed. Briefly, the series bridge has the advantage of being able to be compensated for strays, very simply and effectively for the whole target impedance range. However, the series bridge's X dial has a very steep and cramped scale when converted into terms of reactance, which can introduce serious errors of measurement. This can tend to magnify small parallax errors to such an extent that at low frequencies even readings of resonance would be suspect. The dial is misleading, because the graduations are symmetrical either side of zero; but the whole capacitive reactance range from zero to infinity is tightly cramped into a small angular rotation, and the target range is only a part of this. Then on the inductive reactive side, the target reactance range cannot be accommodated at the higher frequencies. For these reasons the series R-X bridge would probably be avoided by radio amateurs interested in making meaningful impedance measure-

ments. The Parallel R-X Noise Bridge has a different set of problems. Compensation for stray inductance is more difficult in this bridge, and the target range cannot be accommodated at the lower frequencies without the use of a range extender or add-on capacitors. To offset these disadvantages, the parallel bridge gives reactance readings which are symmetrical about the point of resonance; if it has a dial that can be reset and read accurately it can be calibrated to give accurate and reliable reactance measurements, and a positive indication of resonance.

MINIMISING R-X MEASUREMENT ERRORS

If accuracy is needed, I would not choose a series type R-X bdidge; or if I had one, I would convert it to a parallel type, even though a large variable capacitor might be needed, and the bridge would need to be recalibrated. The bridge described by W6BXI and W6NKU in Ham Radio, February 1977, would undoubtedly provide readings of adequate reliability and accuracy for any impedance measurements on HF antenna systems (provided it has been carefully constructed, adjusted and calibrated); but of course it could not provide better accuracy than the standards against which it has been calibrated.

This bridge could be improved on to enable closer readings to be made, by the use of better dials for Rv and Cv of the planetary drive type, and a few other refinements could be included. This might be gilding the lily a bit, and the extra cost might be considered by many to be out of proportion with the benefits that might result. Nevertheless, I built up two models of refined noise bridges, each with planetary dials on the opposite side panels of larger type instrument cases, and have described them in a second article to be published shortly. Because of the attitude which the operator must take up when balancing these brides I called them "The VK3SK Squeeze Boxes".

CONCLUSION

The most common variations of the noise bridge have been described and analysed, with particular emphasis on features which have a bearing on accuracy and reliability. It is clear that those radio amateurs interested in only checking the resonant frequency and impedance at resonance of their antennas, could achieve all they want with any of the noise bridges described, so long as due care is taken, and the pecularities of the particular noise bridge used are understood and allowed for. It is also clear that those seeking the highest accuracy and reliability in the measurement of complex impedance would favour the parallel type R-X bridge. The excellent paper by W6BXI and W6NKU in Ham Radio is again recommended to those individuals, because it does contain matters which have not been fully covered in this paper. My squeeze box is an improvement on their bridges, but is principally their bridge with only a few refinements. The discussions did not include details for VHF measurements. It is hoped that those experimenting with noise bridge measurements above 30 MHz will continue to experiment, and that they may have picked up some ideas in this paper to help in their endeavours. The editor and myself personally would be pleased to hear of your experiments, successes and failures with noise bridges.

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EDITOR'S NOTE:
Part 2 contains the Appendix. The overall size of the article necessitated splitting it in two. Part 2 should appear next month.

(To be continued) ■

Amateur Radio — Where to in the 1980s?

INTRODUCTION

At the 1980 Federal Convention the VK1 and VK4 Councillors (Ron VK1RH and David VK4DT) undertook to produce a paper on the future of Amateur Radio to provoke discussion ,forward thinking and forward planning by the WIA.

Some months have elapsed since that Convention and I have put pen to paper to initiate discussion. Rather than produce a joint paper at this stage, I propose to make my correspondence with David an "open letter" to the membership of the WIA through the columns of AR.

I acknowledge the existence of the ARRL's Long Range Planning Committee; an extract from their progress report, printed in QST for June 1980 is attached as Appendix A. This shows areas identified in the U.S. as needing attention, and many are common to Australian conditions.

In this paper I intend to enumerate a number of areas of interest and applications for forward planning by the Australian amateur and the WIA. I will consider these under two headings: Administration and Technical Considerations.

ADMINISTRATION

Key administrative areas of concern in the 1980s in our forward planning are internal management, national representation and international representation.

INTERNAL MANAGEMENT

The WIA must satisfy a two-way communications route, input (e.g. proposals originating from individual members) go up to the National body and agreed actions or decisions and information must flow back again to the individual members.

MEMBERSHIP REPRESENTATION

With a country the size of Australia membership will remain a problem but not an insurmountable one. Divisions are evolving better representattion systems, e.g. conferences of clubs and state networks, and the next decade may see the subjugation or demise of large state-wide divisions in favour of smaller more representative groups, e.g. the clubs of today. The existing basis of one state — one division — one vote may be replaced by a regional or zone or branch scheme as exists in the UK or New Zealand. Increased representation of the amateur population, that is a greater percentage of amateurs as members of the WIA must be aimed for. An advantage of this is the greater amateur population base to carry out the voluntary work of the Institute.

POLICY DEVELOPMENT

The current procedures for policy development have evolved and changed over the years. Of particular note is the resolution of parochial issues at divisional level with only significant matters being referred to Federal Convention in recent years. This trend of vetting and pre-examination must continue, enhanced by the Federal policy index. The management process based upon annual Federal Conventions, with the right to postal voting throughout the year, with a Federal Executive and paid officers of the Institute for continuity is apparently effective. Some obvious workload unbalances may be remedied by locating some Federal sub-committees elsewhere than in Melbourne. Half-yearly conventions of shorter duration may be a means of spreading annual reporting around the year and responding in a more timely manner to current issues.

DISSEMINATION OF INFORMATION

Without labouring the point of what poor communicators we are, use is made of amateur broadcasts, meetings and AR to disseminate information. The first-named also serves the non-WIA member. In the future this aspect of dissemination must be reinforced, possible avenues are multicultural radio and TV, commercial radio, stored data bank memories on beacons and repeaters, e.g. RTTY, FAX and TV.

NATIONAL REPRESENTATION

National representation of the radio amateur has many facets but can be grouped as representation to the authorities, i.e. the government, and to the people, i.e. the general populace.

REPRESENTATION TO THE AUTHORITIES

First and foremost is representation to the Commonwealth Department of Communications on matters pertaining to the WT Act. This can only be achieved by a combination of regliar liaison, e.g. the current joint meetings, and by lobbying or pressure action for specific key issues. It is useful if these actions are replicated (along party lines) at state level. The future trend will almost certainly be to do more lobbying at the ministerial/senior departmental level, if only to maintain the status quo with other interested pressure groups. Apart from the Department of Communications, representation of the radio amateur will continue to be made to Business and Consumer Affairs (custom matters), Defence (NDO — emergency operations), Transport (use of facilities and tower approvals), Administrative Services (auctions and land use), State Governments (SES) and Local Governments (SES).

REPRESENTATION TO THE COMMUNITY

Recent events centred upon TV and also the Multi-Cultural Broadcasting Authority have demonstrated the need for amateur radio to be represented to the community. Historically newsworthy community relations have generally not been good, often relating to interference or antenna siting problems. In the future amateur radio will need to be considerably more vocal on community matters impinging upon the hobby. This is particularly so in the fields of pollution control, environmental impacts and RFI to both audio (including electronic music) and TV. Not enough PR effort has gone into promoting the community value of amateur radio as a hobby for all age groups. Attention to both ends of the age spectrum, senior citizens and youth clubs would be beneficial.

INTERNATIONAL REPRESENTATION

IARU. The key to international representation is through the IARU. Our continued active involvement in this area is essential. Indeed Region 3 nations should be assessed and graded according to their acceptance of amateur radio to permit the direction of information campaigns. In addition support must be given to amateur radio representative societies in emerging nations to achieve a cohesive Region 3 body.

ITU. The second area of international representation is to the ITU and occurs by way of the IARU but has national implications also. The next WARC may possibly be late in this century with several meetings of international importance on a selective scale in the interval. The amateur must have input, probably through the national authority Department of Communications, but also through the IARU, to these deliberations. When is it time to form a WIA WARC watching/steering committee? And what about funds for delegates?

TECHNICAL CONSIDERATIONS

STANDARDS

Amateur operating standards and technical requirements have evolved over the years; the last major change was the introduction of the novice licence, and no major changes are foreseen. There is no support for lowering of technical standards and the present licence series permits incentives by upgrading to AOCP. The only change seen to the CW requirement is international acceptance of qualifications.

NOVICE LICENCES

There is ivedence that the novice band segments are crowded, but there is also indication of tapering off in numbers of new licences. The major issue facing novices is not increased privileges but assistance to pass the AOCP and upgrade.

LIMITED LICENCES

The limited licence has been available for about 25 years and has reached a stable state of existence. Minor areas worthy of consideration are joint novice/limited licences with CW privileges on all

authorised bands and possibly increased VHF/UHF privileges in the way of modulation modes.

REGULATIONS

Development of changes to regulations whilst a national representation matter must be first initiated by the practitioners and not the administrators of amateur radio. Better policing of regulations and operating procedure must be achieved by joint Department of Communications and radio amateur action. To this end the existing advisory committee practice must continue and be extended on a mutual trust basis. In summary the development of amateur strength must be balanced, progressive and in quality rather than quantity.

FREQUENCY BAND UTILIZATION

Throughout the next sunspot cycle low period there will be a need to select the best frequency band for the task to minimise mutual interference. The existence of multi-band HF transceivers, ATUs and multi-band antenna together with multi-mode VHF/UHF equipment makes this an easier task than in the past.

Band plans will need refining, or even defining for the three new HF bands, to permit co-existance of the many modulation modes and power levels. Little used bands must be populated by means of incentives or other attractions some of which are discussed later in the VHF/UHF considerations.

MODES & TECHNIQUES

Modulation modes and associated techniques must be developed to best utilize the existing frequency allocations. On HF this will call for optimisation of intelligence versus bandwidth and the improved rejection of harmonics and spurii, both in the frequency generation/transmission and reception equipments.

At VHF/UHF emphasis must still be given to simple, easily operated systems, particularly where available bandwidth is large.

With increased interest in digital data transmission, ultra low power CW operation, meteor scatter, moon bounce, RTTY, FAX, fast and slow scan TV, all possibly supported by the microprocessor, considerable heed will need to be paid to electromagnetic compatability (EMC).

LIKELY AREAS FOR DEVELOPMENT

Whilst likely areas for development are only limited by the amateur's imagination and possibly the existing or future regulations, the following are worthy of consideration.

LOW S/N DETECTION

the development at reasonable cost of The advent of microprocessors permits signal processing systems for the reception of low signal to noise ratio signals.

MESSAGE STORES

By utilizing digital data storage in IC memories it is possible to construct "store and forward" translators, news service message stores and training or testing signal sources, e.g. CW or "quick brown fox boxes". This approach is applicable to HF for RTTY and SSTV storage and VHF/UHF for higher data rates, e.g. video. Yet another application is for warning messages for weather, propagation and satellite predictions.

VHF/UHF BAND DEVELOPMENT

In order to populate the VHF and UHF bands a progressive system of constraints and incentives is proposed. For example it is proposed that development of existing popularly used bands be limited to new and innovative applications only. This would mean no more new FM repeaters on 2 metres in high density areas (country development would continue lagging populated areas by, say, five years). Progressively higher frequency UHF bands would be opened up by the establishing of firstly beacons (a known signal source and frequency check), then wide band (FM) translators followed by narrow band applications.

As the available bandwidths are generally quite large all three steps could co-exist with again a cut-off date for lower level systems. The aim is always to populate using easily designed less sophisticated equipment and develop upwards in technical quality. Successive developments might include signal processing, specialist modulations and associated translators.

Satellites would be treated in exactly the same way as earth bound stations, advancing in step to greater utilize the newly developed equipments yet not forgetting the rag chewing section of the amateur community. R. Henderson VK1RH.

ANNEX A — Areas that need Attention

Extracts from "ARRL's Long Range Planning Committee — A Progress Report", QST June 1980.

"A few of the critical items that are widely perceived include:

1. The urgency of finding ways to better control the use of amateur frequencies and to discipline offenders, and the need to improve our capability for locating and identifying sources of improper transmissions.
2. The need for a stronger and more effective relationship with government.
3. The importance of expanding and strengthening international co-operative relationships.
4. The desirability of emphasizing quality rather than quantity in the development of the ranks of future newcomers to amateur radio and retention of the code requirement as a vital communication skill.
5. The importance of stimulating greater interest and participation in both the public service and experimental dimensions of amateur radio.
6. The considerable interest expressed . . . the subject of increased membership involvement in League affairs.
7. The need for stabilization of the ARRL headquarters staff and the re-assurance concerning the League's financial stability."

Proposed Long Term Objectives for the WIA

By David VK4DT

1.0 **SCOPE**

This report defines specific long term objectives for the WIA and examines their application to WIA activities at both Federal and Divisional levels. It recommends acceptance of these objectives by the Federal Council followed by a review of current activities.

2.0 **INTRODUCTION**

The 1980 Federal Convention recognized the need to establish a plan for the guidance of the future activities of the WIA. The success of the Amateur Radio Service at the recent WARC was perceived to be the result of early and extensive preparations. The momentum of these achievements could be easily dissipated unless adequate planning was made for the future.

The first step in the process was seen to be the identification and acceptance of long term objectives for the WIA. Once these objectives had been established, short term plans could be formulated and then tested for conformance with them. These reviews could also provide the stimulus for movement into different areas of activity.

3.0 **LONG TERM OBJECTIVES**

The aim of the WIA is to generally promote the interests of the Amateur Radio Service. This aim can be quantified into the following long term objectives. These are not necessarily in order of importance.

.1 **REGULATORY**

To actively promote responsible self-regulation and good operating practices within the Service.

To negotiate with the appropriate authorities for continued deregulation and for extension of privileges.

.2 **TECHNICAL**

To promote and support technical research and activity within the Service.

To promote effective and efficient use of the frequency resources allocated to the Service.

.3 **PUBLIC RELATIONS**

To establish and maintain an adequate level of public awareness and understanding of the nature of the Service.

.4 **EDUCATIONAL**

To conduct and promote education programmes to assist intending licensees and to maintain and raise the technical standard of existing licensees.

To establish and maintain a requirement for an adequate tech-

nical standard for intending licensees.

.5 **INTERNATIONAL**
To establish and maintain adequate working relationships with international amateur radio organizations.

.6 **MEMBER SERVICE**
To establish and maintain an adequate level of general services to members of the WIA.

4.0 **APPLICATION OF THE OBJECTIVES**
Adequate development of the above long term objectives will provide strong support during future investigations into the need for an Amateur Radio Service or into its frequency allocations and privileges. Such development must be balanced, i.e. no area should be over or under developed.

Current WIA activities at both Federal and Divisional levels should be examined and compared with the objectives. This exercise will undoubtedly reveal areas requiring attention and perhaps lead to restructuring in various areas.

Certain activities can only be properly managed at a Federal level whilst others are best handled on a Divisional basis. It is proposed to examine each area in some detail and make recommendations.

REGULATORY. This area involves liaison with the Department of Communications and standards-making bodies as well as other Government departments. It is also responsible for the internal self-regulatory processes, e.g. Amateur Advisory Committees, band planning, gentlemen's agreements, Intruder Watch, etc.

It is considered essential that these activities be co-ordinated at a Federal level even though significant Divisional involvement is necessary for some aspects.

TECHNICAL. This area should promote such activities as satellite operation, Project Asert, specialist modes, VHF, UHF, microwave activity. It should encourage amateurs to follow the "state of the art" in such areas as reduced bandwidths, spurious emissions, etc. It should use magazine articles, seminars, workshops, etc., to achieve these aims.

Existing groups such as VHF/UHF Advisory and Repeater Committees should be given responsibility in this area. Divisions have a strong role in this area and should support and encourage affiliated clubs to conduct workshops, establish Asert stations, generate magazine technical articles, etc. Federal oversight of progress would be required.

PUBLIC RELATIONS. This area is predominantly a Divisional responsibility as the most effective publicity is generated at this level. Public service activities such as WICEN, JOTA and third party traffic work are also most successful at this level. Federal oversight and co-ordination is still required as well as attempts to achieve nationwide publicity.

EDUCATIONAL. This area is mostly a Divisional responsibility as licence and higher level classes and seminars are most effective at club levels. The production of magazine articles, training notes and books does require Federal co-ordination. The scope of all Education Officers should be widened to encompass higher level training aspects.

INTERNATIONAL. This area is a definite Federal responsibility and covers such aspects as IARU, WARC representation as well as liaison with the national bodies of other countries.

MEMBER SERVICE. This area should be shared responsibility. It would cover such activities as QSL Bureaux, bookshops, contests, awards, disposals, etc.

5.0 **ORGANIZATION**
The structure of both the Federal Executive and Divisional Councils should reflect the objectives of the WIA. Members of each should be delegated the responsibility for oversight or management of one or more objective area. The various Presidents can then evaluate progress and performance in each area and take the necessary corrective actions.

The Federal Executive should have members allocated to Regulatory, Technical, Public Relations, Educational, International and Member Service areas. Divisional Councils should have members allocated to Technical, Public Relations, Educational and Member Services.

6.0 **SUMMARY**
The six long term objective areas should be debated by the membership and by the Federal Council. Existing and future activities should be examined for variance. The various councils should examine their structures in the light of the established objectives.

7.0 **RECOMMENDATIONS**
It is recommended that —

1. The six long term objective areas be debated at the 1981 Federal Convention with a view to their adoption as WIA Long Term Objectives.
2. Following the adoption of WIA Long Term Objectives a review be carried out of existing activities at Federal and Divisional levels for their conformance and possible expansion.

D. T. Laurie VK4DT. ■

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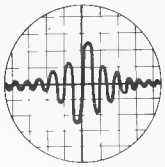

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PART FOUR

MODERN DAY MILITARY HF MAN PACK TRANSCEIVERS, POWER SOURCES AND ANTENNA SYSTEMS

Using an FT901 here to an MLA2500 2 kW linear at 400 watts up a 60 ft. tower to a 6 element TH6DXX with VHF/UHF array and 150W transmitters. Sounds like the ultimate amateur station? Yes, that's my shack; it was fun getting going and operating but there are still horizons left which have been barely explored and I'd like to get into them now.

Thanks to the Palomar PTR130K I have been introduced to modern day military technology.

Even when I've sold my Palomar and my complete station it will still take me two years to save up the $18,000 price tag on a modern day military back pack unit. It will be QRP, no excess current consumption, complete HF coverage. Much of what I am paying for, e.g. the military specifications I don't really need but the only way to make that next step from the Palomar is into military equipment. There does not appear at present to be any comparable hand-held HF units in the middle price bracket.

These modern day military units are available to anyone — military and civilian users alike. Of course the high price tag has stopped these units reaching all but the most serious users and experimenters. They are the ultimate in man pack transceivers.

Produced by government and private industry in various countries, let's look at those from Britain, Israel and Canada.

THE BRITISH PRM4031 RACAL HF/SSB MAN PACK TRANSCEIVER

Claimed to be "the smallest of its type in the world".

Covering **1.6 to 30 MHz continuous** in 100 Hz steps selected from six mechanical click switches showing the numerical frequency.

USB, LSB, AM (but unfortunately a BFO running on the receive mode) and CW modes are available.

Frequencies are **synthesiser controlled.**

10 watts power output with low power switch.

Narrow band filter used for CW.

A single control is used to tune an in-built antenna tuning unit across the entire 1.6 to 30 MHz range. A special LED display built into the current meter indicates the required direction for rotation of the tuning control.

Fully protected against open and short circuit antenna conditions.

POWER SUPPLY

Is a 12 volt 4 amphour nickel cadmium rechargeable battery fitted inside the unit.

WEIGHT

Man pack with headset, whip antenna, nickel cadmium battery and haversack — 7 kg.

DIMENSIONS

Width, 230 mm (9 in.); height, 75 mm (3 in.); depth, 335 mm (13 in.).

OPERATIONAL TEMPERATURE RANGE

—10°C to +70°C.

TRANSMITTER CURRENT

1.8A (SSB), 3A (CW).

RECEIVER CURRENT

160 mA (max.). Compare with the FT7B modified to give us 250 mA (typical).

Provision for 3 foot combat antenna or 8 foot whip or dipoles.

THE ISRAELI PRC174 TADIRAN HF/SSB MAN PACK TRANSCEIVER

Described as "the advanced radio set answering the challenge of modern military communications". "Designed to compete for living space in the notoriously crowded HF spectrum."

Covering 2 to 30 MHz continuous by using a digital synthesiser. 100 Hz steps are selected by six thumb-wheel switches.

USB, LSB, CW (narrow and wide band) and double sideband AM.

BATTERY ECONOMY

During prolonged listening periods, the portable transceiver may be switched to the SAVE mode to reduce battery drainage. In this mode, most of the receiver circuits are quiescent during 9 out of 10 time units. Full reactivation occurs only when an input signal is sensed during the tenth time unit.

Modular construction and provision for automatic overall testing by means of a special test set, without removing the transceiver from its case.

200 WATTS POWER OUTPUT

Three **types of battery** are available — lithium, silver zinc (which will provide more than 16 hours operation) or nickel cadmium (more than 11 hours operation). Operation is based on 1 : 9 transmit/receive ratio.

SUPPLY VOLTAGE

Is 22-32V DC which seems typical of the high power 20 watt back pack units as compared to the 10 watt 12 volt British unit.

OPERATING TEMPERATURE

—45°C to +65°C.

DIMENSIONS

Height, 68 mm (2 in.); width, 262 mm (10 in.); diameter 297 mm (11 in.).

WEIGHT

5.7 kg (less battery).

A hand driven generator is available to charge the battery in the field.

A completely automatic antenna matching unit is built into the man pack transceiver. Tuning is controlled by a processor consisting of chip-and-wire modules and ROM/LSI circuits which store the tuning programme. Tuning time is 2 seconds typical, 5 seconds maximum.

A solar cell battery charger is also available for field charging.

THE CANADIAN AN/PRC515 COLLINS HF/SSB PACK SET

"A 20 watt lightweight HF man pack transceiver built to meet a full range of tactical communications requirements."

Using a synthesiser in 100 Hz steps to cover 2 to 30 MHz. Can be ordered to cover 1.8 MHz.

USB, LSB, AM, CW and line audio input for data transmissions.

An 8 foot (2.4m) whip antenna is usually used in the man pack configuration. The automatic antenna coupler provides full power with automatic control of antenna tuning. The antenna coupler is returned automatically when necessary without interrupting transmissions. This provides optimum tuning in changing terrain and ensures maximum efficiency under the rapidly changing antenna conditions encountered in man pack use. The whip antenna is quickly attached or detached and can be folded and stored in the pack when not in use.

TEMPERATURE RANGE

—54°C to +65°C.

Total immersion of the unit in 1 metre of water.

Operation up to 3000 metres (10,000 feet).

Size: Width, 320 mm (12 in.); diameter, 70 mm (3 in.); height, 220 mm (9 in.).

Weight (no battery): 5.7 kg.

Total weight with battery, transceiver and pack frame: 10 kg.

A 1.8 amphour 25 volt battery is sufficient power for a 12 hour pack set mission. A spare battery, higher capacity battery or hand generator can also be carried as part of the set. During extremely cold weather the battery may be kept under the operator's clothing.

A control unit can be connected to the transceiver via an extended cable. In this way a person carrying the pack set can also fully operate the set. The hand set, 600m microphone headset, CW key or data modem connect to the control unit.

The basic man pack requires no change to turn it into a vehicle or fixed station unit. It can be deployed for short range communications or sky wave (long range) working. The pack set can be slipped into the mounting tray in a jeep or other vehicle in seconds.

Using add-on units the pack set can be turned into a 100 watt or 400 watt vehicular transportable station powered by battery, line or petrol-driven generator.

AUTOMATIC ANTENNA TUNING TIME
3 seconds nominal, 7 seconds maximum.

EASE OF MAINTENANCE
Using internal audible indicators the faulty main unit is identified.

Test set ST2 isolates the fault to a module in the main unit.

Test set ST3 isloates the faulty component.

This completes my survey. As can be seen the possibilities are limited only by the funds available! ■

Start. The weir at Yarrawonga.

Finish. New Year's Eve at Swan Hill.

WICEN Murray River Canoe Marathon Xmas 1980

Middle. "Mobile" Stationary at Barnham.

QSP

SATELLITES

Amongst other items in the new AMSAT magazine "Orbit", volume 1, number 1, is an article by ZS1BI who combs the satellite frequencies for their own style of rare DX. "Orbit" magazine has evolved out of the AMSAT Newsletter. ZS1BI comments that satellite activity on HF is now rather limited to Oscars and USSR satellites, particularly 5 kHz either side of 20 MHz. The move nowadays is to microwaves to provide greater bandwidths for high-speed data transmissions not possible on VHF, although many signals can be heard between 136 and 138 MHz and between 149.85 to 150.05 MHz. ■

ABC-TV now has its programmes going out over the first National Broadcasting Service UHF translator — Channel 44, Adelaide Foothills.

Viewers who can't get a decent reception from ABS-2 (and who have a UHF band on their TV set) can put up a UHF aerial, call in the serviceman and join the elite few receiving Channel 44.— From "SCAN", June 23 1980. ■

THREE-CONTINENT TELEPHONE HOOK-UP

An $80 million contract has been awarded to Standard Telephones and Cables (STC) to manufacture and lay 3400 kilometres of submarine cable which will form part of the first telephone cable network to link three continents — Europe, Africa and South America.

STC will be responsible for the southern link, from Senegal to Brazil. This will consist of a 14 megahertz cable with a capacity for 1380 simultaneous telephone calls

The network, called Atlantis, should be in service by mid-1982 and will increase capacity for calls and cut delays.

The northern link, from Portgual to Senegal with a length of 2900 kilometres and capacity for 2580 simultaneous telephone calls, will be handled by the French company, Submarcon. ■

Amateur Radio along the Canning Stock Route

August-September 1980

Keith Scott VK3SS

After nearly twelve months planning such an undertaking, and making a trial run across the Simpson Desert in 1979, a few members of the Victorian Range Rover Club decided the idea was feasible.

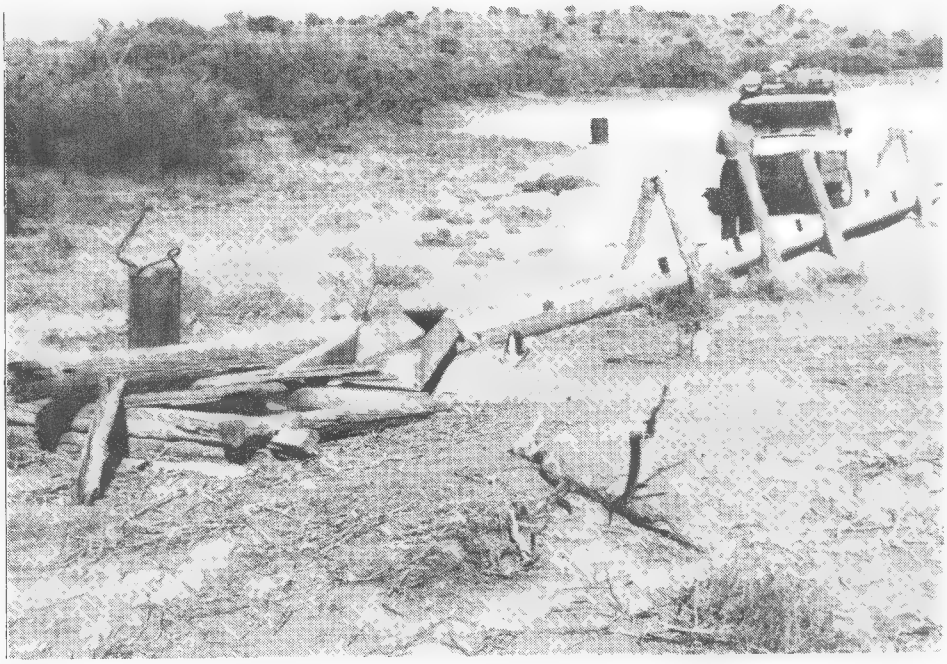
So in August 1980, seven Range Rovers, one Ford F100 4WD and a motor cycle travelled via Alice Springs north-west up the track over Tanami Desert to the north of West Australia. VK3SS guaranteed to keep the party in touch with the rest of Australia.

We called in and camped one night some two-thirds up the track near the WA border, at Rabbit Flat, where Bruce Farrands, his wife and twin five-year-old boys somehow eke out a living in a corrugated iron abode from which they serve drinks (cold assorted), some food stores, and petrol. This enterprise depends on a lovely fresh-water lagoon fed from springs, and a small camping site, complete with prefab toilet facilities, caters for groups like ours, assorted outback tourists and camping tour buses. They made history in 1975 when Mrs. Farrands suddenly decided to produce the twins. Not having previously contacted medical assistance on account of their remoteness, Bruce, assisted by the Flying Doctor Radio, quickly and successfully learned how to perform midwife duties.

The Tanami track is now upgraded into a fairly good sandy road, quiet suitable for any vehicle in good condition, provided it has not rained heavily. Anyone travelling that way is recommended to be sure of a stop-over at Rabbit Flat.

We emerged at Balgo Aboriginal Community in WA where previous arrangements had been made to take on our fuel. That meant 75 gallons of petrol per vehicle, plus 25 gallons of water. Added to enough food for several weeks, and heaps of spares, the vehicles squatted very low to the ground, making us advance very slowly and with fingers crossed for at least the first day. Since they were never likely to be so overloaded again, and weight could only go down, our confidence built up as the petrol went down at nine miles per gallon. One day later we left any resemblance to a road, knowing the next 1000 miles were on tracks made by a few vehicles over the past ten years or so. Well at least we were now on the path of Canning Stock Route, all intact and full of optimism.

Readers, please don't pin me down to exact dates, etc., regarding this historic route. Several books record the journeys of intrepid explorers some 80 years ago and, after many probes and expeditions by explorers and surveyors, in 1907 and 1908 a party led by the man after whom it is named, A. W. Canning, established this long cattle route. With horses and camels paked and pulling wagons of supplies, they found and dug sites for wells about 20 miles apart, mostly 6 ft. by 3 ft., ranging from six to sixty feet deep. The object was to enable cattle to be moved over the Great Sandy Desert and Gibson Desert, from the Kimberley area to the growing populations in the WA goldfields. At this point Amateur Radio should fit into the story.



Remains of old well on edge of dry salt lake, Lake Tobin.

Many West Australians helped in the organisation and safety of our journey, and the Travellers' Net should be introduced right now. For many years, starting at 0300Z or 1300 EST, it opens on 14.105 MHz. **Keith Williams VK6KC,** who is radio operator at Kuri Bay cultured pearl headquarters, high up on the north-west coast, leads the net, with assistance from many others, mainly in WA. Some of the regulars are **Doug VK3YK, Harry VK6ZZ, Tom VK6TB, Jack VK6EJ.**

On this net, mobiling amateurs all over Australia call in, and the safety factor alone for all in remote areas is just fabulous. Nearly every day I contacted my son **David VK3DY** in the home town of Maffra. **George VK3XD** and **Doug VK3YK** were daily contacts on 20 metres on the Travellers' Net, and at 2100 hrs. same frequency. 20 metres really works mobile with a helical! **Stewart VK3BSM** was with another party from the same club travelling across the Victoria Desert from Rawlinna, WA, to the Gunbarrel Highway and on to Ayers Rock. We kept the two parties aware of our progress and problems daily. Every day operators from all over Australia joined the net, and the home stations would know where everyone was almost exactly at any time. **VK6KC and VK3YK** could produce this knowledge any time, and they arranged all sorts of skeds to

The author's Range Rover on the stock route.

keep everyone in touch with everyone. If you are travelling in remote areas, or even travelling anywhere, give this net consideration to increase your enjoyment of travelling, plus a safety blanket. Any difficulties that arise can most always be solved or assisted by someone in the net.

To all those valued contacts I made and to all concerned, please accept my grateful thanks.

Back to the Great Sandy Desert. We drove for 10 to 12 hours daily for three weeks and 1100 miles from Balgo to Wiluna. Add about another 100 miles jolting vertically. Crossed over 1000 sand dunes, about 30 with problems solved by towing and winching. The greatest hazard was long dry seed stalks growing up from the spinifex which grew for hundreds of miles in thick clumps, between and on each side of the wheel tracks. These packed under the vehicles and overheated exhaust pipes caused nine very alarming fires throughout the group. We all carried up to three fire extinguishers and used nearly all of them. The only way to minimise this risk was to stop every 15 to 20 minutes, get under the sides and hook out the dry stalks with wire. Fortunately spinifex did not cover all the deserts, otherwise it would take twice as long to make the crossings — fire permitting.

Michael Wilson, a fit young man, rode his motor cycle ahead all the way to pick out the right track as best he could and to locate wells which often are off the track — sometimes nearly vanished, filled with sand, rubble or subsided. Between us we located all but two wells. Most have caved in and were dry, several held undrinkable water, about five of the 62 still had their original steel covers on them and contained drinkable water. We ascertained this fact before deciding to do the journey. Two-thirds of the way down we had arranged a dump of ten 44 gallon drums of petrol, which was carted out via a connecting track of sorts from Newman. We used nearly all this to complete the route over the Gibson Desert to Wiluna.

Many large and small dry salt lakes are in this area — not recommended to drive over, although they look very firm. We knew from previous roprts and personal frights how risky that would be, for below the salty crust lurks unknown depths of smelly black ooze.

Soon we were to deviate to Durba Hills, which run for several miles. They consist of rugged hills of broken up red rocks, but between them exists almost a paradise in the form of a flat area with real grass, plus most wonderful still clear rock pools which are fed from springs. Lovely trees and flowering plants enhanced the scene, some pools could be swum in even. I must point out we took every care not to stir up the water or use soap in it. It was realised this water really belonged to the birds and animals.

On the subject of life on these deserts, Aborigines have vacated the areas many years ago. There is no human habitation

Along the Canning Stock Route, Great Sandy Desert.

at all (a few mineral searchers are probably about, but we saw no signs of them). The wildlife is mainly lizards, goannas, snakes and insects. Not a lot of birds and then only where some water existed. Several herds of camels were sighted, some donkeys, one snake, a few kangaroos, foxes and dingoes. Very limited accessibility of water governs all life on these deserts. Nevertheless it does rain sometimes, and they are anything but barren wastes. Spinifex predominates, great varieties of lovely wildflowers and shrubs were growing everywhere we travelled. It would be correct to describe these vast lonely areas as beautiful.

The very rough going provided an extreme test for our vehicles. The days were very hot, numerous tyres staked by sharp wood and stones, broken springs and fires were the main worries. Before leaving home we ensured the Range Rovers were in first class mechanical condition and plenty of spares were carried. So we had no serious mechanical breakdowns and no towing except at times on tops of very loose sand dunes.

At the end of three weeks from Balgo, nearly 1100 miles across the longest desert trip in Australia, averaging 10 miles per gallon fuel consumption, rarely getting above second gear, some days averaging two miles an hour, we started to find formed roads, and were soon in Wiluna feeling very elated on our successful undertaking. There we washed, looked over the wreckage of an enormous goldmine which, upon closure, reduced Wiluna from a busy thriving town to a few old interesting buildings which are now mostly owned by aborigines. It did have an excellent small caravan park, which surprised and pleased us. Their solar hot water system was very quickly emptied. After refuelling,

Gibson Desert Scene

stocking up at a good little old store, the party dispersed to return in three groups by different routes.

With the Ford and another Range Rover I returned along the old Gunbarrel Highway via Giles Meteorological Station, where six men spend six monthly periods at this very remote spot in the Rawlinson Ranges, WA. Their living conditions are quie comfortable and they enjoy the half-yearly sojourn. Their duties are to check all weather conditions which are radioed to Adelaide, I think. Hydrogen balloons with Radio-Sonde functions are released daily and tracked by radar plus information from the tiny transmitter. Finally we emerged at Mt. Olga and on to Ayers Rock, thence the tourist route home. The trip along the Gunbarrel Highway is another story.

I wonder if I could claim to be the first amateur operator to travel 1000 miles along the Canning Stock Route? ■

WIA Federal Video Cassette Library

John Ingham VK5KG
Federal Videotape Co-ordinator
37 Second Avenue, Sefton Park, SA 5083

The following tells how your radio club can take advantage of this free service offered in the interests of promoting Amateur Radio.

There are three categories of programme.

Group A are those programmes for which the WIA *does* not hold copyright and which are available for loan ONLY and are not to be copied or transmitted. These are available on loan from the WIA Federal Videotape Co-ordinator upon receipt of —

1. Stamps to cover postage of the videocassette to you, and
2. A statement signed by a responsible officer of your club to the effect that the videocassette will be returned promptly upon use and that while it is in his care it will not be copied or transmitted over the air.

Group B are programmes for which the WIA holds copyright. As it is impractical to hold sufficient numbers of each of these to cater for every request for loan, these are available *ONLY* by supplying your own videocassette on to which the programme of your choice will be copied for you to do with as you wish.

Group C are programmes which are not intended as formal, permanent programmes. They are simply videotaped lectures, mostly recorded at the VK5 WIA monthly meetings. **These will be of particular interest to country clubs which may have had until now difficulty gaining access to the same standard of technical lectures as their city cousins.** Group C videocassette masters will be held for no longer than a year, so if you see a title that may interest your club don't hesitate to send in your request.

Both Groups B and C are ordered in the same way — send your request to the Federal Videotape Co-ordinator together with —

1. A blank videocassette of acceptable format, and
2. Stamps to cover the return postage of the videocassette to you.

GENERAL POINTS

The only acceptable videocassette formats at present are the ¾ in. Umatic and the Philips ½ in. N1500. **Regrettably we cannot as yet supply programmes on the VHS or Betamax formats.** Although this service is free *all* requests must include prepayment of return postage in stamps. As a guide a 60 minute Umatic videocassette and box weighs 900g, a 30 minute 775 g, both plus wrapping. An extra 50c should be allowed for a padded post bag.

Order in plenty of time, at least one month ahead, to allow time for processing and mail delays. Urgent requests involving "air parcels post" or "priority paid" are much more expensive!

In "emergencies only" Federal Executive WIA have available for loan one copy of each Group A and B programme. However, dont rely on this as the programme you want may already be on loan or booked for Federal Executive use. ■

Group	Title	Approx. Duration	Availability: Colour/ B & W	WIA Fed. VTR Co-ord. Loan	WIA Fed. VTR Co-ord. Copy Service	Fed. Exec. Emerg. Loan
A	"G6CJ Aerial Circus"	1½ hrs	B & W	√	—	√
A	"7J1RL DXpedition"	1 hr	Colour	√	—	√
B	"Official Opening of Burley Griffin Building" (VK5 HQ)	50 m	Colour	—	√	√
B	ARRL Films — "This is Amateur Radio"	15 m	Colour	—	√	√
	"Moving up to Amateur Radio"	15 m	Colour	—	√	√
	"The Ham's Wide World"	30 m	Colour	—	√	√
	*"World of Amateur Radio"	30 m	Colour	—	√	√
B	"This Week Has 7 Days" looks at Amateur Radio	25 m	Colour	—	√	√
B	"Amateur Radio — The National Resource of Every Nation"	6 m	Colour	—	√	√
B	"The VK5 ATV History"	20 m	Colour	—	√	√
B	*Historic Radio Film	10 m	B & W	—	√	√
B	"ATV in Aust. 1978" (made for British ATV Club)	30 m	Colour	—	√	√
B	*"ATV in G 1980" (Reply by BATC)	30 m	Colour	—	√	√
C	Lecture on "Long Wire Antennas" (VK5RG)	40 m	B & W	—	√	—
C	Lecture on "RTTY" (VK5QX)	40 m	B & W	—	√	—
C	Lecture on "Tracking Oscar" (VK5HI)	40 m	B & W	—	√	—
C	Lecture on "The Signal to Noise Story" (VK3ATY)	45 m	Colour	—	√	—
C	Lecture on a "Hamshack Microcomputer" (VK3AHJ)	10 m	Colour	—	√	—
C	Lecture on the "Apollo 13 Disaster" (VK5ZJB)	1½ hrs	Colour	—	√	—
C	Lecture on "Microprocessors" (VK5PE)	1 hr	Colour	—	√	—
C	*Lecture on "Winning Foxhunts (VK5TV)	1¾ hr	Colour	—	√	—
C	*Lecture on "Mobile Auxiliary Battery Charger" (VK5NX)	25 m	Colour	—	√	—
C	*Lecture on "Two ATV Repeaters — VK5RCN and VK5RTV"	1 hr	Colour	—	√	—

* New Programme.

Atop Mt. Toolbrunup

During October 1980 the West Australian repeater group organised the temporary installation of its portable repeater VK6REE on top of Mount Toolbrunup.

Mount Toolbrunup is 3,500 feet high and is located about 50 miles NNE of Albany on the south coast of VK6.

All the equipment had to be back-packed up a difficult track to the top. It included two 45AH car batteries, ½ full size quarter-wave cavity filters, repeater, aerial, small mast, coax and several other pieces needed to put VK6REE on channel 700 (ch. 8), on air.

The climbing and installation went without a hitch, and the repeater remained on air for about 40 hours, providing trouble free mobile coverage over an 80 mile plus radius.

The repeater was hidden in a small cave just below the summit.

Many contacts took place through VK6REE, which with its very large range, was exciting to use.

Perhaps one day a permanent installation on Mount Toolbrunup will be possible, remote and inaccessible as it is. ■

John VK6ZHV atop Mount Toolbrunup.

Will VK6UU listening to a contact. Will's XYL Terryl is on the cover.

This photo, taken on day of installation of repeater, shows most of the climbers atop Mount Toolbrunup.

The Close of an Era

The death occurred on 25th January of Soly Deitch, the last of the Sydney based disposal dealers, who started in 1946 after the war in the buying of war-time surplus at auction.

The older amateurs will remember the times in the 50s and 60s when the closest one could get to commercial gear was what one could find on the disposal market. During these times all the capital cities had numerous disposal shops — those in Sydney were located round Stanmore, Marrickville, St. Peters and Oxford Street. Sol first started in Glebe in Disposals in 1930.

Sol was on one of his regular interstate train trips to an auction, this time in Brisbane, when he suffered a heart attack. Sol was the last of the electronic surplus dealers from the post-war era and on behalf of the Amateur Radio Service we would like to pass on our sympathy to the Deitch family on the passing of Soly Deitch.—de VK2ZTM. ■

SCALAR — FOR THE DISCERNING AMATEUR

SOME RIGS OFFER PLENTY OF KNOBS AND FLASHING LIGHTS • • • •

BUT

HOW MANY BROADBAND, SOLID STATE TRANSCEIVERS WILL :-

- **Transmit close to full power into a VSWR of 3:1?**
- **Run full power key down for 20 mins. without danger to the finals?**
- **Carry 12 months' unconditional warranty on the finals?**
- **Notch out an S9+ carrier from an SSB or CW signal?**
- **Successfully filter hash and QRM on noisy bands?**
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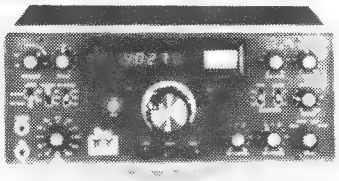

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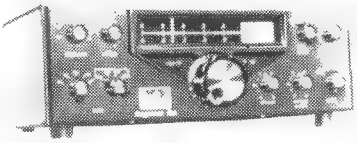

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FORWARD BIAS

VK1 DIVISION

(Postal Address. WIA (ACT Division) Inc., PO Box 46, Canberra, 2600 ACT)

By the time this appears the February AGM will have taken place and the new President, other officers and committee members elected. We'll have details in next month's column. However, should any member want these before April, then just drop a line to PO Box 46.

At the January meeting our guest speaker from the Department of Defence told us about the proposed Australian Defence Integrated Secure Communications Network (DISCON). The system, to be implemented over the next ten years, will provide a secure multi-purpose strategic communications network for the Defence Forces, and will replace the present single-service networks. Techniques to be introduced include low, medium and high-speed digital channels and computer-controlled digital switching.

About 60 members turned up for the meeting and we were pleased to welcome Edgar Olds VK2BY, who was visiting Canberra from Broken Hill. It's gratifying to see intending new members at these meetings — all keen to go for their licences and interested in joining the WIA.

At the March meeting, our guest speaker will be Mr. J. McKendry from the Department of Communications who will give a talk on the Australian Frequency Allocations. In April, Mike Vale VK1VW will speak on Electric-power Vehicles.

CLASSES FOR 1981

This year the Division hopes to again run classes for both Novice and full-AOCP candidates. The AOCP course will take candidates up to the August examination. There's a short one-term course for Novice candidates taking the May exam, followed by a two-term course for the November exam. Both offer basic CW, "faster" CW and theory.

VK1 AWARD

Congratulations to Rod Pritcher VK5AN, our first claimant for the certificate for 6m (SSB) operation.

Finally Fred Robertson-Mudie VK1MM has received that most elegant QSL card from HM King Hussein JY1. Fred may well be starting a new QSL collection category — he's waiting now for a Qatar card from HE the Sheikh A7XA and there's a couple more to come from Saudi Royal Princes! ■

HEARD ANY GOOD "RUMOURS" LATELY?
TELL A.R. ABOUT THEM

VK2 MINI BULLETIN

COUNCIL REPORT

Divisional Council would like to thank all those who responded to our request for photocopies of 68 per cent exam results. Ten replies have been received from three States; 5 from NSW, 3 from Victoria and 2 from Queensland. Of these, 5 were NAOCP (2 for May 1980, 3 November 1980) and 5 were AOCP (1 August 1979, 2 February 1980, 2 August 1980).

We realise, of course, that perhaps the majority of people sitting for exams may not be members of the WA (two of the réplies were non-members) and this brief survey cannot be said to be definitive. The results, however, do not contradict the figures supplied recently by the Department of Communications, indicating that between 4-6 per cent of candidates received 68 per cent in recent examinations. Sydney Radio Branch have informed us that the papers of candidates receiving between 60 and 68 per cent are automatically remarked.

To date (2/2/81) $200 has been donated to the Tower Fund (see February AR). Recent donations have been received from M. Cruden $5, B. Valentine $5, A. Rennie $10, D. Broadley $10 and Illawarra ARS $10.

NSW clubs have been asked to hold meetings of either club executives or the club itself in early April in order to discuss agenda items for the 1981 Federal Convention. Any comments or recommendations from either clubs or members will be gratefully received by our Federal Councillors, Tim Mills VK2ZTM and Wally Watkins VK2DEW. In addition to the club meetings throughout the State, Divisional Council will hold an informal meeting for members at 14 Atchison Street, Crows Nest, on Sunday, 12th April, at 10 a.m. in order to discuss and recommend on Federal Agenda items. (See elsewhere in February and March AR for some of the Federal Agenda.)

Council has resolved that, as affiliated clubs cannot be members of the NSW Division, QSL cards of affiliated clubs resulting from club activities such as JOTA, field days and nets, and bearing the club call sign only, will not be charged the 5c per card handling fee if sent through the NSW QSL Bureau.

The Fourth Conference of Clubs will be on Sunday, 24th May, commencing at 10 a.m. at the Goulburn RSL Club, Market Street, Goulburn. Agenda items for the conference should reach Divisional Office not later than Thursday, 16th April, so that clubs will have one month in which to discuss the items and direct their delegates how to vote.

MID SOUTH COAST ARC

The Mid South Coast Amateur Radio Club held its Annual Meeting in Milton at the home of Frank VK2HQ and his wife, Jean, on Saturday, 17th January last. Frank VK2HQ and John VK2BTQ were re-elected to the positions of President and Vice-President respectively. Jim VK2YGY was elected Secretary/Treasurer.

The barbecue lunch prior to the meeting was attended by 116 adults and children, and six dogs (not a record!). The weather was perfect for the day and a good time was had by all.

(Submitted by Bill VK2AJL.)

Details of three clubs affiliated with the NSW Division:

SOUTHERN HIGHLANDS ARS

C/- Telephone Exchange, Bowral 2576.

Net: Sundays 8.30 p.m. on 3516 kHz using VK2BFI.

Meetings: 1st Fridays at 7.45 p.m. at the Mittagong Shire Supper Rooms.

President: F. Ritchie VK2VGX; Vice-President: G. Goode VK2VIG; Secretary: K. Orchard VK2BZY; Other Committee: T. Lee VK2AOS, B. Goodman VK2ZAG, G. Armitt VK2ZWQ/NHC.

Repeater: VHF VK2RHR channel 7350. Between Bowral and Mittagong, approximately 90 km SW of Sydney. 8W into ¼ wave, receive antenna also ¼ wave separated vertically and inverted. Time out 3 minutes.

Newsletter: Bi-monthly.

MID SOUTH COAST ARC

PO Box 113, Milton 2538.

Lyrebird Nets: Wednesdays 7.45 p.m. on 3617 kHz using VK2BKG and others. Wednesdays 8.30 p.m. on repeater channel 6700.

Meetings: Quarterly in January, April, July and October in Milton/Ulladulla area.

President: F. Hill VK2HQ; Vice-President: J. Telfer VK2BTQ; Secretary: J. Yalden VK2YGY.

Repeater: VHF VK2RMU channel 6700, located approximately 16 km SW of Milton.

GOULBURN ARS

40 Hume Street, Goulburn 2580.

Nets: Sundays at 9 p.m. on 3615 kHz using VK2BTZ. Monday-Friday at 4.30 p.m. on 28480 kHz using VK2VUT.

Meetings: 2nd Wednesdays at 8 p.m. in Goulburn Police Boys' Club radio room.

President: D. Thompson VK2BDT; Vice-President: H. van Bilsen VK2BUT.

Secretary: W. Scott VK2VMK; Other Committee: D. Bell VK2NAW, R. Woodman VK2EY.

COMING EVENTS

7th March, Saturday, 10 a.m.: Close of nominations for 1981 Council NSW WIA.

22nd March, Sunday: Liverpool Field Day. See February AR.

28th March, Saturday, 10 a.m.: Annual General Meeting of NSW Division.

5th April, Sunday, 8 a.m.: Club liaison net on 3575 kHz.

5th April, Sunday, 10 a.m.-4.30 p.m.: VK2WI April Fool's Day plus Four picnic at 63 Quarry Road, Dural. Listen to broadcast for details.

12th April, Sunday, 10 a.m.: Informal meeting at WIC to discuss Federal Convention agenda.

16th April, Thursday: Close of agenda for 4th C. of C.

24th May, Sunday, 10 a.m.: Fourth Conference of Clubs at Goulburn.

News for inclusion in VK2 Minibulletin must reach Box 123, St. Leonards 2065, two days **before** the end of the month.

Susan Brown VK2BSB.

SPOTLIGHT ON SWLing

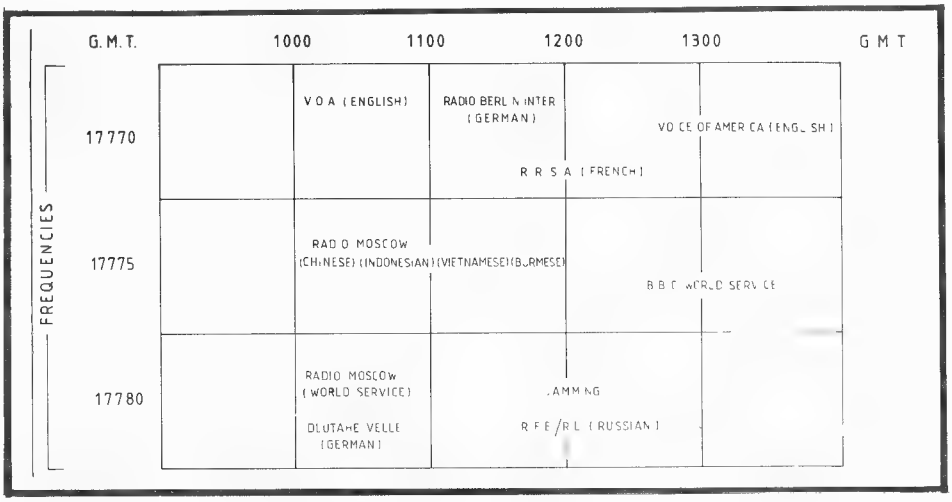
Robin Hawood VK7RH
5 Helen St., Launceston, Tasmania 7250

One aid to the serious DXer to keep abreast of frequency alterations, changes in tranmission times, etc., is a band chart. By means of this chart, it is possible to spot any changes, or that a particular frequency is being used by too many stations at any given time. In Fig. 1 I have set out an example of what a band chart looks like.

By reading the frequency of 17770 kHz at 1130 GMT, it can be seen that two stations are utilizing this wavelength. Normally, they would cancel each other out, however, they could be serving different regions. Radio RSA could be transmitting to West Africa, while the East German station is aimed for S-E Asia. So there would not ordinarily be any mutual interference except in non-target areas such as in Europe.

The 17780 kHz example shows two stations between 1000 and 1100 GMT. Both let us say are serving the same area — the Middle East. The Russian station will have the stronger signal as its relay transmitters are sited closer to the target area than the one in West Germany.

Normally, international broadcasting organizations submit their proposed frequencies and schedules quarterly to the International Frequency Registration Board, a division of the ITU in Geneva. There they can assess if there will be mutual interference, or that any particular broadcasting frequency is heavily loaded.



They advise the particular organizations of any potential users of that channel, so that alterations can be effected. Even so, cross-channel interference still occurs. With some administrations refusing to deal with the IFRB, such as Albania, Vietnam and North Korea, this adds further complications to the task.

Some broadcasters have entered into frequency sharing arrangements. There are sections of the stations that employ personnel exclusively in frequency planning and scheduling.

Another complication to their task is the presence of "jamming" stations. Because several countries do not wish their citizens to listen to certain broadcasts, they transmit an interference patter on the particular channel to be employed. Unfortunately, the jamming signals spill over on to adjacent channels, thereby restricting their use as well. The amount of this jamming will vary from time to time, depending on the current political situation. So the stations are forced to move about in frequency to find a clear channel.

I collate the information needed for a band chart from one-air monitoring, from DX publications, station schedules, and from some of the DX programmes put out by some stations. These charts are valid for each broadcast period. There are four periods each year to take account of changing propagation due to seasonal fluctuations. These come into effect on the first Sunday in March, May, September and November at 0000 GMT, and are known as the "M", "J",, "S" and "D" Periods respectively. For example, as from March 1st it will be known as M-81.

The World Radio TV Handbook 1981 should be available shortly. Published in the United States by Billboard, it should retail for about $A20 from leading technical bookshops. This Handbook contains details of the majority of radios and television stations with their frequencies, transmission times, antennas, locations, etc. It is invaluable for those who seriously are into short-wave monitoring.

Those wishing to keep up with the latest news of Amateur Radio DX may find that the ARRL Headquarters Station, W1AW, transmits a daily C/W bulletin at 2200 GMT on 14090 kHz. It not only contains DX news, but propagation forecasts and news of VHF "happenings". It also transmits on 21090 and 28090 at other times and also utilizes RTTY on these channels as well.

I have also heard two new programmes for the SWL from the BBC World Service. These replace their much lamented World Radio Club. The first one is simply titled "Waveguide" and is a five minute weekly slot. It is designed to aid listeners who are experiencing difficulties in reception of the BBC World Service. It is best observed on Fridays at 2155 GMT on 9.41 MHz.

The second programme is called "Listening Post". This is a programme of what the world's broadcasting stations are saying about current events. It is prepared by staff of the BBC Monitoring Service and contains the comments of foreign language broadcasts. This 15 minute programme is heard very well on 26650 or 15070 kHz at 1115 GMT, Wednesdays.

Another long-running programme is "Sweden Calling DXers". This session has a variety of accurate DX brodcasting information each week in several languages from Radio Sweden. It is heard on 21610 kHz at 1200 GMT in English.

Well, that is all for this month. If you have any suggestions for this column, feel free to write to me. Until then, the best of DX and 73s. ■

QSP

ANZAAS

A circular from the organiser advises that the 51st Congress of the Australian and New Zealand Association for the Advancement of Science will be held in Brisbane from 11th to 15th May, 1981, at the University of Queensland. The Congress theme will be "Energy and Equity". ■

H44 BEACONS

Through IARU R3 comes news that the beacon H44HIR on 50.005 MHz has been put into 24 hours continuous service. The beacon runs 10W to a vertically polarised dipole. Reception reports go to SIRS, Box 418, Honiara, Solomon Is. The Society hopes to set up a 10m beacon in the near future as their contribution to the IBP (International Beacon Project). ■

YOU and DX

G. (Nick) Nichols VK6XI
6 Briar Place, Ferndale, WA 6155.

Yuuuuuuk! yuk what? well how else would you summarise conditions of the last month or so. No serious DXer should have to suffer such abysmal propagation — even pre-dawn excursions on to 80 yielded very little in the way of expected European DX, the higher bands weren't too much use either.

Oh well, after such a poor month you should be in the family's good books, trips to the beach, visiting relatives, manicuring lawns, weeding that jungle (oops, sorry, I mean garden), losing some of that Christmas paunch in the process, you should be in fine shape for the upturn in conditions we all hope to occur about now (if you were silly enough to stay glued to the receiver you must be a glutton for punishment).

FACT AND FICTION

Well if nothing else it's sure been an interesting month for the rumour mongers, most of the information is vague but there are hints at some interesting activity over the coming months.

Early to mid-February should see some activity from Nepal by Japanese amateurs, if this one came off on schedule the call signs should be 9N1BMK and 9N1JA with QSLs to go to JA8BMK.

4W1 activity this month? It is believed a Jordanian operator has secured a licence and plans to visit the area during March (if this proves to be false a US amateur certainly will be granted a licence later this year, applications can apparently take upwards of six months, and it is hoped a month long single operator operation will eventuate).

April should see some activity from Juan Fernandez Island CE0Z, multi-operator and multi-band by several CE5 amateurs.

From the DX Bulletin comes the news that Kingman Reef and Palmyra Island should also be activated during April.

Back into the Middle Eeast — May/June has been heavily tipped for activity from 70; hopefully more solid info will be available on this one by next month.

Anyone who worked A7XE during the period 13th June to the 10th September, 1980, will be unhappy to know that it was an illegal operation, the call sign is held by Willi Rass, who was absent from Doha for that period. The QSL manager cleverly teed up the pirate — DL2MY — has been requested to stop issuing QSLs and the ARRL will not accept same for DXCC credit. QSLs for legal activity should go to Willi's home call DF4NW.

Hearty congratulations this month must surely go to the ARRL for putting an end to the ubiquitous "No greenstamp no card type expedition". They have ruled that such intimations on air will result in the cards not being accepted for DXCC credit and further that any operators involved in such practices will not be eligible for any ARRL awards. Your help in ensuring active policing of this ruling by reporting any such verbal demands is recommended.

Whilst on the subject of greenstamps and the like, how about the VK6 amateur who boasts of obtaining rare QSLs by including $10 "stamp" when sending direct — such actions will undoubtedly make the obtaining of such confirmations so much harder for everyone else. How about putting the money to a better use — I can recommende a great psychiatrist.

For those of you who worked Phil 5N0PSN and perhaps have wondered why QSLs have been slow, Phil was unlucky enough to collect a bullet through his jaw whilst in Lagos and returned to the UK — he will not, needless to say, be returning to Nigeria.

ON THE BANDS

10 Metres:
9V1VV, SV0BL/SV5, KC6KR, 5T5JD, W5JMM/SU and J73PP were the only bright spots in an otherwise dull month on phone. On CW things weren't exactly jumping with BV2A, 9X5AB and HG0DG somehow managing to get through the poor conditions.

15 Metres:
On phone an absolute disaster, QRM from someone's answer to the woodpecker wrote off any activity above 21.200 almost every evening, CW with good narrow filters wasn'te quite so bad with FK8DO, HP1XRR and ZK2VU coming through at good strength.

20 Metres:
Forget the QRM on phone and generally unstable conditions, CW was the mode to concentrate on C21BS, EA8QO, EA9QO, EA9EU, FM7AV, HK0BKX, JT1BH, J28CK, VP9DR and 5N0DOG, and for the RTTY fanatics 9K2KA all had solid signals.

40 Metres:
Apologies to the phone boys (and girls), but that mode really was a total waste of time, CW again showed what a valuable mode it can be, OH2BAZ/OH0, ZK2VU, 4S7MX, 9M6MO workable even with relatively poor antennas.

80 Metres:
Apart from the usual Spanish group on phone and generally poorer (than last year) conditions prevailing, European stations were quite workable on CW (not that I worked many), however the stations in greatest demand were without doubt EL2FY, FK8DD, 4X4VE, 8Q7AQ and VK2VU.

160 Metres:
Good old top band, written off by almost everyone as a waste of time, really turned up some fine DX, KP4KK/DU2, F8VJ, GD4BEG, GI3OQR, GM3IGW, KH6ND, OZ1LO, OZ7YY, VS5RP, VS6DO, plus W, VE and several G stations.

Many thanks this month for the valuable contributions from **Eric L3-0042, Merelyn L2-0118, VK6RZ, VK6HD and VK5NKO,** and also for the considerable feedbeck, particularly from SWLs to the January column; it's nice to know I'm not writing in a void.

QSL INFORMATION YOU MAY HAVE MISSED

FM7AV — via F6BFH.
HK0BKX — via WB4QFH
H44PG — Box 606, Honiara, Solomon Islands.
VS5JA — via JA1OYY.
ZK2VU — via DL2RM.
4Z4XB — KA5BBL.
9M2GZ — via Box 487, Penang, Malaysia.
VP8PU, VP8QG, VP8QJ, VP8NJ, VP8WA, VK8ZV — A. W. Deprato WA4JQS, 205 Cherokee Trail, Somerset, Kentucky 42051.
A35FB — via JA7SGV.
A4XIZ — via Box 891, Muscat, Oman.
A7XAH — via DJ9ZB.
A9XCE — via Box 5750, Bahrain.
BV2A — via K2CM.
C21BS — via Box 162, Nauru.
CR9CT — via G3KDB.
EA6BH — via DL7FT.
EL2FY — via JA1BGS.
FP0FSZ — via VO1FB.
J2OA — via K6LPL.
KC6KR — via JA8JL (CW), and JA8DNZ (SSB).
KV4AAV — via K6PBT.
PJ2CC — via AA4M.
ST0AS — via DK2OC.
T2AAD — via W9GW.
T2AAF — via JA7SGV
TL8WH — via W5RU.
VQ9AA — via AJ3N.
VK9MM — via N0MM.
VS6DO — via K4CIA.
W5JMM/SU — via KA5AZT.
3D2GM — via JA0GMM.
5N8BRC — via Private Mail Box 1263, Maiduguri, Nigeria.
6D7LCH — via WD8NKT.
6U25YP — via Box 1533, Khartoum.
8Q7AQ — via DL7EM.
9X5AB — via Box 81, Kigali, Rwanda. ■

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VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston, S.A. 5233

MARCH 1981

VHF/UHF BEACONS

Freq.	Call Sign	Location
28.335	VK2WI	Sydney
50.005	H44HIR	Honiara
50.100	KH6EQI	Pearl Harbour
51.022	ZL1UHF	Auckland
51.999	YJ8PV	Vanuata *
52.013	P29SIX	New Guinea
52.150	VK5KK	Arthurton †
52.200	VK8VF	Darwin
52.250	ZL2VHM	Palmerston North
52.300	VK6RTV	Perth
52.320	VK6RTT	Carnarvon
52.330	VK3RGG	Geelong
52.350	VK6RTU	Kalgoorlie
52.370	VK7RST	Hobart
52.400	VK7RNT	Launceston
52.425	VK2RAB	Gunnedah
52.435	VK3OT	Hamilton †
52.440	VK4RTL	Townsville
52.450	VK2WI	Sydney
52.500	JA2IGY	Mie
52.510	ZL2MHF	Mt. Climie
52.800	VK6RTW	Albany
53.000	VK5VF	Mt. Lofty
144.010	VK2WI	Sydney
144.162	VK3RGI	Gippsland
144.400	VK4RTT	Mt. Mowbullan
144.475	VK1RTA	Canberra
144.500	VK6RTW	Albany
144.600	VK6RTT	Carnarvon
144.700	VK3RTG	Vermont
144.800	VK5VF	Mt. Lofty
144.900	VK7RTX	Launceston
145.000	VK6RTV	Perth
147.400	VK2RCW	Sydney
432.400	VK4RBB	Brisbane
432.450	VK3RMB	Mt. Bunningyong
10.3 GHz	VK6RVF	Perth *

* Denotes a query. I did hear the YJ8PV beacon was off the air temporarily. Can anyone advise? I also don't know the activities of the VK6RVF 10.3 GHz beacon, whether it runs all the time or only by appointment. Perhaps somebody from Perth will write to me giving details of its operation, its power, antenna, mode of operation, service area intended, etc.

† Indicates VK5KK and VK3OT beacons are very consistent in their operation but may be off at times when the operators are making rather important 6 metre contacts. Both these beacons are audible at this QTH, and the VK3OT beacon is surprisingly consistent considering its greater distance. There are very few days when it is not audible.

All the other beacons listed this month are understood to be operating 24 hours a day, and in fact, with the exceptions of YJ8PV and VK2RAB, all six metre beacons have been heard by VK5LP during December and January. Two metre beacons heard have been VK3RGI, VK1RTA, VK6RTW, VK3RTG, VK5VF, VK7RTX and VK6RTV. So that doesn't leave very many in the list which have not been checked during the past two months!

BEACON RESPONSE

Following my discussion re beacons in the January issue of AR I have received several letters in response to my request for feedback. I thank the writers, and refer some of their comments to readers in the hope it may stimulate some more of you to write to me. Surely I don't have to hang bait to you again like last month when I asked "Do the Geelong boys still hear VK7RNT on 52.400 now they have a beacon on 52.330?". That was a tongue in cheek question loaded to the hilt with bait. They are 70 kHz apart, and I would imagine the only time problems would be likely to occur would be if you live close to the beacon and need to look through it to hear VK7RNT.

Mike VK3ASQ was the first to reply with a very prompt letter, but he didn't fall for the bait! He writes:

"You surely can't be serious when you ask if the Geelong boys can still hear VK7RNT on 52.400 when VK3RGG is 70 kHz away. 70 kHz? With my beam at the beacon it's a very big signal but on both my FT620B and IC551 it's barely discernible 5 kHz away, and not there 10 kHz away! I might add the beacon is FSK and I feel that is a possible advantage, it may be a different kettle of fish with CW as there may be key clicks or at least some 'popping' either side of the carrier.

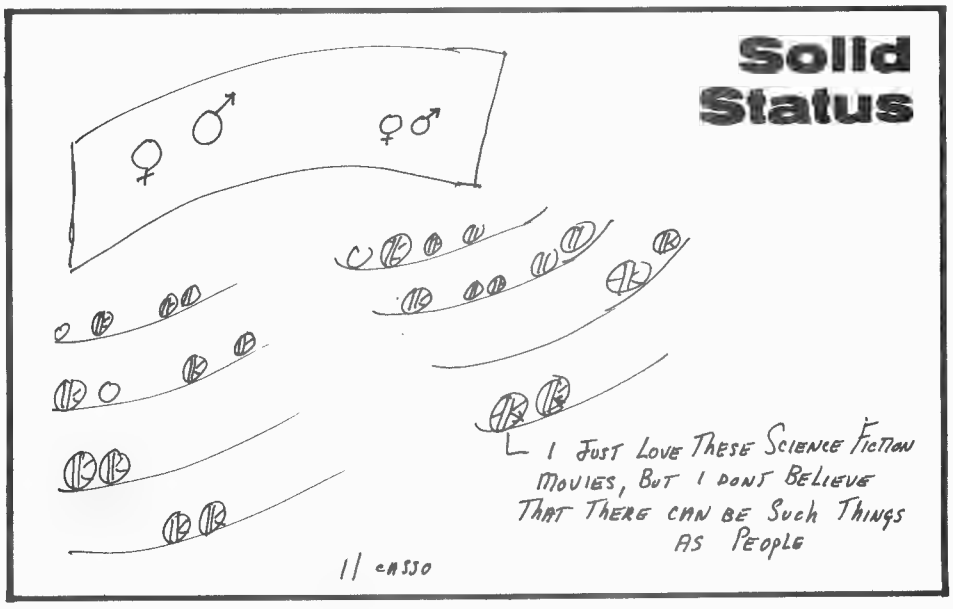
"There are some obvious problems to be sorted out, such as the example you cited in the Adelaide case. But how much of these are due to poor equipment at the receive end as you mentioned, and what of the CW mode of transmission used by the beacon, perhaps a change to FSK will improve the situation. After all, we have to put up with 10 kW ERP of wide-band FM — 250 kHz below the most used section of the 6 metre band from Ch. 0, it's been here for a long time and it doesn't bother us too much — the spurious emissions appearing in the band are a different problem.

"Individuals or groups doing their own thing with beacons certainly won't improve the situation. If the band plan doesn't suit the majority let's set about getting it changed, but for goodness sake let's have a band plan and stick to it. The VK2WI example is a good one. How stupid to site a beacon on 144.010. This is completely contrary to the band plan and must be a real headache to anyone seriously interested in 2m CW DX. The same comments can be levelled at VK3RGI, where did they get 144.162 from? Did someone have a spare crystal?" (Over to the builders of VK2WI and VK3RGI for satisfactory comment.—5LP.)

"Perhaps one can ask how effective from a DX point of view some beacons are. The situation has admittedly changed for the better in recent years, but how many receiving set-ups are at their best (particularly in the case of antennae) at frequencies so far removed from the normal frequency of operation as 52.9 (VK6RTT) (since shifted to 52.32 — 5LP), *53.0 VK5VF or 145.0 VK6RTV, 147.4 VK2RCW, and do the ZLs still have their beacons running on 145.1, 145.2, 145.3 and 145.4? Did any VK ever hear them?"*

John VK2ZXU from Broken Hill writes on the same subject:

"Firstly regarding the beacon listing. For those new to VHF and those not normally using beacons it can be confusing as to just what one should be listening for. I would suggest from time to time the ror-



mat and mode of transmission should be given along with the list, e.g. whether MCW, CW, FSK, ident, etc.

"Secondly, your point regarding frequency allocation is well taken. Obviously these have been made on a case by case basis in isolation as in the examples you quote where local beacons (and repeaters) are too close to remote beacons on prime pahts for comfort. The fact that MUF openings can be quite sharp in cut-off, particularly on 6 metres, posses some difficulties here. It seems to me the only rational way out of this is to base a frequency tatble on the closest spacing that can be tolerated by the cross-modulation characteristics of state-of-the-art commercial equipment bearing in mind that beacons are on the whole used mainly by serious workers who will be using such equipment or better and that standards will improve as time goes on. One can then choose frequencies for beacons so they do not interfere with remote beacons of interest in any particular area. This approach has been adopted for TV and FM, why not the Amateur Radio Service beacons?"

Gordon VK2ZAB writes a thought-provoking letter from which I am pleased to quote:

"My comments are about 2 metre beacons. There has been talk about shifting beacon frequencies and a band plan for some time. I may have forgotten but it seems to me that this band plan is a bit of a mystery. Has it been published? If so, I feel it does require a bit more publicity. I have yet to find anyone who knows what it is all about!

"There is a case for shifting the NSW 2 metre beacon but it is not one which you have mentioned. In fact, from my observations the reasons you have outlined as being sufficient to justify shifting beacon frequencies don't seem to hold much water if you like mixed mataphors. Specifically, there does not seem a case for shifting beacons because they interfere with DX listening.

"The NSW beacon on 144.010 is not close enough to the DX calling frequency of 144.1 to worry anyone, and to prove the point I conducted an hour long QSO with Ralph VK1RK over a 280 km path on 9/1/81 between 1133 and 1238Z. We made contact on 144.1 and immediately went to 144.02, stayed for about half an hour and then went to 144.015. The beacon on 144.010 didn't worry either of us. It should not have worried him anyway but I look almost straight through it to Canberra and its level here is about 25 dB above 9, which means it is about 450 uV input to 50 ohms on my scale. My receiver is a TS700A and I don't think it has any better selectivity than most others. The point is that very few people would see their beacons at a higher level than that, and so that's that!

"However, the NSW beacon is on a prime spot as far as the international scene is concerned in that moon bouncers use that frequency or very close to it. I'm not in the moon bounce league power-wise but I might just be able to hear them if the beacon were elsewhere in frequency. Others have expressed the same view.

"Nevertheless, the beacon is used for other things too. Notably antenna tests, and for that reason it should not be far removed from the DX part of 2 metres. Obviously it would be of no use for checking a 2 metre DX antenna if it was stuck up in the 146 to 147 MHz part of the band.

"Canberra beacon. It is not too close on 144.475 to the Albany beacon on 144.500. Anyone who can't separate those two needs a better receiver! However, why is the Canberra beacon vertically polarised? This seems to be a bit of non-logic if ever there was one.

"The biggest menace on the beacon scene is that operator who insists on the beacon frequencies to conduct local QSOs. This happens here with the Canberra beacon and with the Auckland beacon on 145.100. These people probably don't know the beacon is there. Given that the beacons have been there for some time and people still don't know where they are, any shifts in beacon frequencies will see a new crop of people who don't know and this problem will be compounded. Therefore, if any shifting is to be done it must be done only after:

1. *Full publicity is given to the proposed changes.*
2. *Adequate time allowed for general debate.*
3. *Full consideration given to the needs of all users and non-users too.*
4. *Consideration is given to the long term benefits to amateur radio in general.*

"This last point may seem a bit obscure at the moment but given past performance it should now be a mandatory agenda item at all meetings where decisions are to be made."

There you have comments from three thinking people. One obvious point which is emerging is that it seems to be possible to work up quite close to the beacons without too much problem, and it will be of interest over the next few months when I hope others will write to me outlining what they see as problems or benefits from the beacons. I earnestly ask the VHF operators with something constructive to say to write as soon as possible please, and let us try and form a proper opinion of this matter in a rational way, without anyone going into hysterics over it. In writing bear in mind I would like to publish extracts.

On the question being asked about the WIA BHF Band Plan, it took me about an hour to find the relevant information tucked away in the July 1977 issue of AR under the 1977 Federal Convention Report. In this the beacon segment is listed as follows: 52.300 to 52.400 — beacons only; secondary beacon segment. 52.400 to 52.500 — beacons only; primary beacon segment. 144.400 to 144.500 — beacons only; primary beacon segment. 144.500 to 144.600 — beacons only; secondary beacon segment. 432.400 to 432.600 — beacons only.

Although I cannot find the information, I understand further suggestions were made for frequencies to be allocated on a call area basis, e.g. 52.330 being VK3RGG, and made up of being located in the secondary segment starting at 52.300 with the second 3 indicating a Victorian station, hence 52.330. A Queensland station would have 52.340, but a primary beacon, i.e. a capital city beacon presumably, would be allocated 52.440. If you care now to look at the beacon frequencies you will see how far we are from achieving anything approaching order. The same applies to 2 metres.

Finally, for the moment, may I also draw your attention to page 21 of December 1972 AR, where reference is made to a P. and T. Regulation RB4/4/23, which clarifies the standard call signs to be issued to beacons. Already there has been a break away from that list, with VK2RCW, VK3RGG, VK7RST, VK2RAB, VK3RGI, VK4RBB and VK3RMB not conforming. Perhaps I am out of date and there is another list, but the whole P. and T. list either starts with RS or RT, followed by another lettering as required. Anyway, all this discourse so far should get the pot boiling pretty well in a few places. Next month I will have a few things to say about some of the comments being made in VK5, especially since there has been talk of a frequency shift and reversion to the former power output of 30 watts.

SIX METRES

Whilst towards the end of January there was the usual fall off in Es activity, earlier there were some very good openings. VK5 worked ZL on 7/1, 8/1, 9/1, 10/1, 23/1. JAs were worked on 8/1, 11/1, 18/1, 23/1, 27/1. On 10/1 **Dave VK9ZD** came through with signals to S9 and was worked by about every VK5 available, and in a manner befitting the amateur fraternity — quite different from the braying of the FK8 opening when I felt like hiding my head in shame — a bit of sorting out with a few operators can work wonders at times! Anyway, VK9ZD came through around 0900Z and stayed for about an hour, when he was still calling CQ. I know Dave also worked **VK1VP** and several VK2 stations, not sure who else. Same day **Eddie VK4LX** at Mt. Isa was 5 x 9 and said he had worked ZL. By the way, TV stations sometimes have their uses! Dave VK9ZD said he was alerted the band was open when he noted ABS2 over the top of the stations he was viewing! Same day received a report the ZL 432 MHz beacon had been copied in VK2.

On 11/11 **Hal VK4DO** gave me a Ross Hull number of 59970 which is a pretty good score by any standards. Haven't worked him since to find out if he made

the 1000 contacts. To show the changeable nature of six metres towards the end of a Es period, on 29/1 I worked **Garry VK5AS** at Cowell on our West Coast, a distance of 230 km with signals at 1110Z. The following night at 1039Z I worked him again this time with signals peaking to S9 and very consistent.

TWO METRES KEEPS GOING

Whilst two metres might not share the long distance glory achievable by six metres at times, it is nevertheless a very consistent band for signals. During January 2 metres was open to VK6 in Albany 1/1, 2/1, 3/1, 4/1, 6/1, 7/1, 9/1, 11/1, 18/1, 23/1, 26/1, 30/. Additionally, it was open to Perth on 21/1 during the day when **Wal VK6KZ** was frantically phoning to try and get someone on from VK5, but of course all the likely operators were being loyal to their employer and working at the salt mines. The Adelaide beacon was apparently very strong in Perth which indicates an interesting set of conditions in that it isn't always a night time or early morning period which produces the strong signals. Bad luck, Wal!

18/1 was quite a good night for 2 metres to VK3 with **Les VK3ZBJ** and **Noel VK3AUG,** both from Frankston, providing the main signals source. At the same time **Trevor VK5ATD,** at Rendlesham in the south-east, was 5 x 9 here.

News has just filtered through to me that **Wal VK6KZ/P** at Cape Leeuwin on the south-west tip of WA had contacts back to **Don VK6HK** in Perth on 22/1 at 1200Z on both 1296 and 2304 MHz, using 1 watt and signals to 5 x 9 over the 274 km path. Conditions were too poor to Wal for me to get much other information, but it is hoped to have a full report for next month. It looks like a very good set of contacts, congratulations to you both.

COMMENTS FROM LETTERS

Neville VK2QF has written from Hargraves, central west of NSW, to say that the construction of a 4CX250R final giving 200W PEP has eradicated TVI to Ch. 1 in all modes and power levels, so with a TS600 to replace the IC502 he has been having a ball on six metres.

24/10 KH6IAA 0843Z and 0924Z 5 x 3. JA 0920 to 1058Z. 25/10 KH6IAA heard 1056Z. 2/11 1013Z then JAs 1033 to 1141Z, followed by groundwave into Sydney 230 km to VK2BA. 3/11 JA 0241Z. 17/11 VK4ZZW. 23/11 VK7 at 0750Z. 6/12 VK7 and VK5 0523Z. 10/12 VK4ZJK Cairns. 14/12: VK4DO, VK7, VK3, VK5. 17/12 VK3YLV 0800Z SSB and FM 5 x 9. 18/12 ZL2BGJ, ZL TV S9+ but no beacons or other ZLs. 19/12 VK4DO 0800Z. 20/12 ZL2BGJ, ZL TV again, no beacons! 21/12 VK7, VK4 0130Z, also short skip to VK2DLR at Lismore 580 km. 5 x 9 both ways for 45 seconds! VK5 0240Z ZL2BGJ 0340Z. 22/12 VK4 VK6OX 0636Z 5 x 6 both ways, VK8GF 1122Z 5 x 9. 23/12 VK6OX 5 x 1 0200Z, VK4DO 9099Z. 24/12 VK4 0330Z. 25/12 VK4RR and VK4ZJK, Cairns, early in day. Local lightning strike caused bushfire from 0000Z onwards. Had to go! Later worked VK1VP at 0952Z on backscatter, nice Christmas present as it meant WAS on 6 metres!

26/12 bushfires again. 27/12 ZL2 0038Z 5 x 5. 28/12 2133Z ZL3AAN, followed by Sydney stations VK2BQJ and VK2BA on backscatter. Then ZL1, 2, 3 and 4 throughout day. Beacon ZL2VHM up to S9+ at times. Band open to all over Australia. Seven beacons heard in VK2, 3, 5 and 7. H44 not heard. 30/12 VK4ACE 0125Z, VK7ZIE 0300Z. 2/1/81 erected modified beam, promptly worked FK8CR 0200Z, followed by YJ8PD at 0241Z, signals S3-5. FK8AB at 0422Z plus VK1, 2, 3, 4 and 7. 4/1 FK8BG 0009Z S3. 5/1 VK4. 8/1 VK4 and VK2. JA1 and JA2 at 0018Z S3-4, 15 QSOs. P29DJ at 0154Z 5 x 1. VK6OX 0223Z, VK6KZ 0400Z, then more VK6, 7, 3, 1, 2 and ZLs around 0900Z. 9/1 JA 2346Z then VK4 and ZL. 11/1 VK4 and ZL. 12/1 VK2ZQX and VK2ZZV on backscatter at 0137Z. VK1VP. VK8GF 1046Z 5 x 9, ZL2AQR, 1056Z, VK8GF still around after long chat ending 1250Z. 15/1 ZL1, 2, at 0120Z, VK3, 4, 5 and 7. JA8RC in CW at 0530Z. 18/1 JA 0250 to 0355Z 5 x 9, 27 QSOs. Thanks for writing, Neville, your report will give those compiling propagation charts another area in which to take informtaion.

I have received a letter from **Lance Coombe** from the Adelaide suburb of Mile End, who remarked his six metre observations go back a long time, and that the weekend of 27/12 to 29/12 was one of the best he can remember. On 27/12 VK2, 4 and 5. 28/12 was a good day we all remember so well, Lance copied signals from no less than 11 VK5s, also VK1, 2, 3, ZL2, ZL3. On Monday, 29/12, a further 11 VK5s, including some fresh call signs, then on to VK1, 2, 3, 4, 6, 7. Signals to 5 x 9. 8/1 started at 0115Z with VK4, VK5, then a series of JA1, JA5 and JA6 peaking to S7 between 0120 and 0136Z. Good to hear from someone who has been keeping an eye on things for a long time.

THE NORTHERN HEMISPHERE ON SIX

I thought things had slowed down a bit even in the Northern Hemisphere, but after reading the February 1981 issue of "QST" and "The World Above 50 MHz" I have my doubts. Here are some of the better extracts.

> "Maybe it wasn't a fluke! Last month's column carried a special flash announcement of an historic VHF achievement, the Atlantic Ocean had been spanned on a frequency higher than 50 MHz without the use of moonbounce. VE1ASJ hal successfully completed a 6 to 4 metre crossband contact with G4BPY. But could it ever happen again? The answer was not long in coming. On the morning of 7th December, Andy was at it again, this time working G3COJ, G4ENB and G4ENA/A, the three Gs transmitting near 70.1 MHz. This time VE1ASJ reported the signals to be "quite good" as opposed to the earlier session in which G4BPY's signal was 439. It appears the 6 to 4 trans-Atlantic contacts may be possible more often than we have thought. The Summer Es season could hold the key to more such QSOs with many more stations than a single well located VE1. Remember the times last summer that the ZB2VHF beacon was heard along the East Coast of USA?

These epic 6 to 4 metre contacts were not the only excitement the ionosphere had in store. On 27/11 about 0930Z G4BPY, followed closely by G5KW/A and G3COJ completed crossband 10 to 6 metre contacts with VK6OX in Western Australia operating on 52 MHz. (Reported last month in AR — 5LP.) Thus to G4BPY and G4KW go the honours of accomplishing the first crossband WAC. G3COJ still needs South America to complete his. Then in mid-December, Western Europe was again the focal point of 6 metre DX. On the morning of both 13th and 14th, around 0900Z, Hong Kong station VS6BE was received. On 14th he was joined by VS6FX. Crossband 10 to 6 contacts were completed by a number of UK stations, including G4BPY and GW3MHW. In addition EI6AS and PA0RYS made 6 metre two-ways with the Crown Colony. G4BPY reported on the second morning VS6BE's signal peaked 40 dB over S9!

Returning to late November, I5TDJ provided a good percentage of the excitement before Thanksgiving. Of course, VE1AVX had already worked him on the 17th. Piero's 50.319 beacon was heard by a number of US East Coast stations on 25th November. On 26/11 the beacon was in again but much weaker. This was too much for N3AHL. Jim put in a phone call to Italy and Piero raced home from work and worked him as well as W3XO. Soon the skip lengthened and WA5IYX and other 5s and 4s made the grade also. I5TDJ's 50.020 MHz signal was significantly better in San Antonio than here, running 579 at WA5IYX's QTH.

Despite the noteworthy contacts reported above, November certainly was a better month than December has been to date (written on 14/12). The sheer volume of outstanding contacts made in November makes it impossible to list even a small percentage of them. Many reports of the ZS stations into the West Coast serve as one example. Although November 1980 was probably not as good as the same month a year earlier, in terms of length and intensity of openings it was more productive from the standpoint of activity and distribution of paths open. One example is turned in by K8WKZ. In six days between 10/11 and 16/11, Dave accomplished that long-sought goal that many of us have yet to achieve — WAC. Con-

tacts with ZS6LN, JA7QVI, VY1CM, DL3ZM/YV5, ZL2KT and EI9D did the trick. Wow! In the midst of all this international DX activity, the principle game for many remains WAS, and the most needed State seems to be Hawaii. KH6IAA has been filling that void for many. In the process Al satisfied his own WAS craving by working several West Virginian stations on 29/11. He thus becomes the second KH6 to work all 50 US Statss on 50 MHz. KH6NS accomplished the feat last year.❞

There are times it seems when it would be nice to live in the Northern Hemisphere. The odd rare contact we get down here like FK8 and H44 are small by comparison with what goes on in the north almost on a day to day basis.

Also from "The World Above 50 MHz" comes news of the accomplishment of Kjell SM7BAE, who, when he worked K0ALL in North Dakota on 24/11 achieved Worked All States of USA on 2 metres by a non-US amateur and which also became the first all-EME Worked All States! I am sure all in Australia will join with me in congratulating Kjell for a fine effort, one well deserved when one looks at what he has done for VHF in general.

TECHNICAL TIP

Someone phoned me recently asking for a word or two about what precautions should be taken when connecting up high power RF transistors for use on 2 metres, and adherance to some of the following points might save someone the trauma of destroying these relatively expensive transistors.

The transistors are usually manufactured in the SOE or "Stripline-Opposed-Emitter" package wherein the collector lead is designated by a chamfering of one corner, and the base lead will be opposite this, with the remaining two wings being the emitter leads. Be careful not to orientate the thing 90 degrees, this will result in the base-emitter junction being reverse biased, and they don't like that! The leads are made from springy material and the transistor can be easly damaged if you place upward pressure on the wings. Therefore observe carefully when heatsinking the device that you thread the nut on to the mounting bolt so that it is only finger tight and observe that when tightening takes place no upward pressure will be applied to the leads. Tighten by holding the wrench flat on the end of the projecting screwed portion with pliers or wrench, and then tighten the nut one-quarter to one-third of a turn with another wrench or pliers. This should allow you to disassemble the device without damage if you have to later on.

Remember these devices have a body package made of Berylium Oxide, so be careful not to chip or scratch the body as this substance is very poisonous. It will help the soldering in process if before you mount the transistor you tin the underside of the wings, then sweat-solder them to the UCB, excessive solder is totally unnecessary.

During the tuning up process do not exceed the rated maximum collector current or supply voltage; never apply drive without a DC return for the base or without collector voltage present, and if you are tuning up with a metal tool, watch where you put it, especially if it slips out of the slot of a trimmer! And that's all there is to it. Good DX!

Closing with the thought for the month: "You can learn many things from children — for instance, how much patience you have."

73. The Voice in the Hills. ■

AR AWARDS

The Publications Committee announced these in the February edition of AR, except for the

HIGGINBOTHAM AWARD

It now has pleasure in advising that

Mr. SAM VORON VK2BVS

has won this award, for meritorious service to Amateur Radio. Worth $100. ■

Dial a Prop

A telephone service, telephone (02) 269 8614, provided by the Ionospheric Prediction Service, detailing the state of the sun, the ionosphere and the earth's magnetic field, began on 1 October, 1979. The daily report includes the following details:

1. The current status of IPS disturbance warnings. If one is current, its text will be given. The warnings include details of solar activity, sudden ionospheric disturbances (daylight fade-outs), and current and expected geomagnetic disturbances.
2. The current state of solar activity (flares, active sunspot regions), and the expected course of solar activity over the next three days. Flares are described on the M (1-9) and X (1-9) scales which refer to their medium or strong X-ray effect.
3. A report on ionospheric conditions in the Sydney area and a forecast of general radio propagation quality for the next three days (good, fair, poor).
4. The current state of the geomagnetic field and its expected behaviour over the next 24 hours.
5. The Ottawa 10.7 cm solar radio flux for the previous 24 hours and the predicted values for the next three days.
6. The observed magnetic A-index (Fredericksburg) for the period two days previously and the predicted values for the following three days.

The duration of the message is between 45 and 90 seconds and the contents of the message is updated daily at about 1000 AEST (0000 UT), with more frequent amendments at times of high solar, geomagnetic, or ionospheric activity.

This service is titled the IPS Daily Solar Geophysical Report and the telephone number is (02) 269 8614. ■

UNITY IS STRENGTH

INTERNATIONAL NEWS

HONG KONG

From the IARU R3 Secretary comes news that the Hong Kong Amateur Radio Transmitting Society (HARTS) has announced VS6 "Activity Days" for 4th-5th April, 1981, when as many VS6 stations as possible will be active on as many brands and modes as possible, including 6m.

Also, ZL stations have been allowed to continue to use 7.1 to 7.3 MHz provided no interference is caused to broadcasting services.

RECIPROCAL LICENSING

Break-In for December 1980 reproduced a letter from their Director of Telecoms Ops annuoncing that licences for qualified amateur visitors to New Zealand will be issued in the ZL0 call sign series, effective 1/1/1981. Where there is a reciprocal agreement in existence between New Zealand and the visitor's own country (includes Australia) licences will be issued valid for up to one year and renewable on aapplication as long as the visitor's home licence remains current. In this case the call sign would be ZL0"AA"/VK3. Where a visitor holds a Commonwealth qualification (other than VK) recognised as equivalent to a New Zealand certificate, two different procedures apply, namely, for a visit up to 14 days a short term licence and for a visit 14 days to one year a permanent style licence endorsed with an expiry date.

NATIONAL DISASTERS

News, via IARU, lists brief details of the value of amateur radio as a resource during the Italian earthquake disaster. Radio amateurs from Rome were reported to be the first source of information conecrning the terrible death and destruction of this earthquake. Said to be faster and more agile than military communicators, the radio amateurs were the only source of information during the long loss of commercial power. The amateur net coordinator in Rome was in fact a blind amateur. Amateurs moved in from outside the stricken area to set up emergency communications, handling such matters as desperate requests for blood, blankets, news and names of victims.

IRAN

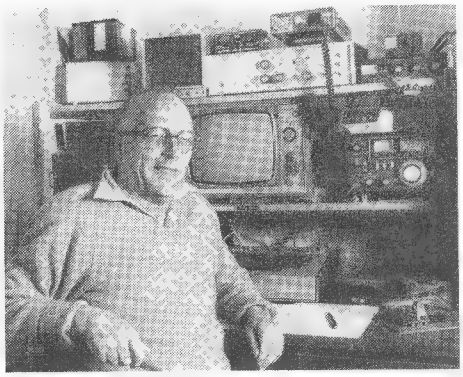
The IARU has been notified that the Iranian Radio Amateur Society has been established since 9/9/1980 under a Management Committee consisting of EP2JP, EP2ES and EP2FM. The address was given as Box 64/873 Teheran.

CCIR

An Interim Working Party 5/4 of the CCIR will meet in Geneva for a week from 2nd March to discuss the possibility of establishing a fourth ITU Region. The IARU will be represented. ■

CONTESTS

Wally Watkins VK2DEW
Box 1065, Orange 2800



March

7/8	ARRL Phone DX	CQ 2/81
14/15	Commonwealth CW	FCM
14	"Corona" 10 Metre RTTY	CQ 3/81
21/22	Commonwealth Phone	FCM
21/22	BARTG RTTY	VK2SG
28/29	CQ WW WPX SSB	CQ 2/81

April

4/5	Polish CW	FCM
18/19	Polish Phone	FCM
25/26	King of Spain Contest	FCM
25/26	Helvetia Contest CW/Phone	FCM

May

30/31	CQ WW WPX CW	CQ 2/81

EXCHANGES

ARRL DX, RS and power (3 digit number).

Commonwealth, RS(T) plus QSO No., start at 001.

CQ WW WPX, RS plus QSO No., start at 001.

BARTG RTTY, RST, QSO No. and name.

1980 AUSTRALIAN NOVICE CONTEST

RESULTS

PHONE

5NMB	837	5NCE	244
1NCV	756	4NQU	242
2NYL	727	2NXD	230
6NID	724	5NFI	193
2VPQ	602	4VCE	187
1NDA	501	4NIK	169
2NZN	421	4VHW	107
2VHP	402	8FB	1418
5NLC	357	3DAK	305
7NWR	338	2BQS	188
2VVT	290	2BVU	127
5NVW	254	6JS	94

CW

5NEP	74	3XB	90
5NLC	43		

5NEP 74, 5NLC 43, 3XB 90.

THE COMMONWEALTH CONTEST
1981 RULES

TRANSMITTING SECTION

1. The general rules for RSGB HF contests published in the January 1981 issue of "Radio Communication" will apply.
2. When: From 1200 GMT on Saturday, 14th March, 1981, to 1200 GMT on Sunday, 15th March, 1981.
3. Eligible entrants: Members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British mandated territories.
4. Contacts: CW (A1) only, in the 3, 5, 7, 14, 21 and 28 MHz zands. Contacts may be made with any station using a British Commonwealth call sign, except those within the entrants' own call area. UK stations may not work each other for points. In accordance with the IARU recommendations, contestants are requested to confine their operations to within the lower 30 kHz of each band.
5. Scoring: Each completed contact will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third contacts with each Commonwealth call area (as listed in the accompanying table) on each band. All British Isles stations (G, GB, GD, GI, GJ, GM, GU and GW) count as one call area.
6. Logs: Separate logs are required for each band. Each band log should be separately totalled and should include, at the end, a check list of call areas worked on the band. Logs must include MT, call sign of station worked, RST/serial number sent, RST/serial number received and points claimed. Separate band totals should be added together and the total claimed score entered on the cover sheet.
7. Entries: Entries may be single or multi-band. Single band entries should show contacts on one band only. Details of contacts made on other bands should be enclosed separately for checking purposes. Multi-band entries will not be eligible for single band awards. Each entry will consist of the separate band logs together with a signed declaration that the rules and spirit of the contest were observed.

   Entries should be addressed to D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, East Sussex, TN22 1UB, England. Adjudication of this contest will commence on Monday, 18th May, 1981. Any entry received after this date may be excluded from the contest. Overseas stations are therefore advised to forward their logs by airmail.
8. Awards: To the winner, the BERU Senior Rose Bowl; to the runner-up, the BERU Junior Rose Bowl; and to the leading UK station, the Col. Thomas Rose Bowl. Certificates of merit will be awarded to: (a) first, second and third placings in the home and overseas multi-band sections; (b) the leading home and overseas single band entries on each band; and (c) the leading station in each overseas call area. ■

COMMERCIAL KINKS

RON FISHER
VK3OM
3 Fairview Avenue, Glen Waverley 3150

MODIFICATIONS TO THE PHILIPS FM321

These modifications for the Philips FM321 were supplied by Gareth Davey VK2ANF, who supplied some interesting comments on the rig which are worth passing on.

The performance of the FM321 is very good, both on air and on bench testing. In Sydney, with its hilly terrain, mobile to mobile to mobile contacts over any reasonable distance will rely heavily on repeaters, although base to base is no problem on simplex.

I was very impressed with Philips' attitude to the sale of FM321s. They only sell direct from their branches, and then only to amateurs. I was advised that they would be unable to sell to me if I did not have an amateur call sign which is required for their paper work.

Now on to the modifications.

80 CHANNEL OPERATION
STANDARD OPERATION

The channel selector switch enables 40 channels, 25 kHz apart, numbered 01 to 40 as displayed. The up/down counters in the synthesiser section actually only count to 39, the next being channel 00; however, OR gate IC5 senses 00 and causes the

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ST. ALBANS, VICTORIA 3021

display and synthesiser to go to channel 40 (439.000 MHz).

MODIFIED OPERATION

To achieve 80 channel operation, an unused output from the up/down counters is connected to programmable divider IC3 and the display encoder, along with the disabling of IC5's output.

Thus the channels displayed range from 00 (438.000 MHz, a popular simplex frequency) to 79 (439.975 MHz), covering the entire 2 MHz of the 70 cm FM portion as recommended by the WIA.

COMPONENTS REQUIRED

Short length of thin hook-up wire.

MOD INSTALLATION

1. Remove the plastic case of the FM321 by undoing the four (4) self-tapping screws. Disconnect the transceiver from a DC power supply.
2. Disconnect pin 13 of IC5 from the rest of the circuit. This can be performed in several ways, e.g.:
   — Cut the IC lead (pin 13) with a pair of fine hide-cutters;
   — Cut the PC track from pin 13 as it appears from under IC5 just before it reaches a plated-through hole in the PCB.
3. Connect a short length of hook-up wire from IC11 pin 14 to IC3 pin 13.
4. Connect a DC-coupled CRO or voltmeter to IC4 pin 13.
5. Select alternatively channels 00 and 79, and note that the DC voltage out of IC4 should range from 0 volts to about +10 volts.
6. With the channel set for 0 volts from IC4, carefully adjust the slug in L9 until the voltage reading just increases above 0 volts (5¼ turns in is typical).
7. Using a UHF dummy load or matched aeial system, transmit on channel 00 and then channel 79. In both cases the red TX indicator should light indicating synthesiser lock.
8. Carefully disconnect the test equipment and re-assemble the plastic case.

MODIFICATION 2
BNC ANTENNA CONNECTOR
STANDARD OPERATION

The antenna connector fitted as standard to the FM321 is the SO239 type found on almost all amateur HF and VHF equipment. Reference to manufacturers' specification sheets on this type of connector leaves some doubt as to its suitability at any frequency (the phrase "non-constant impedance" occurs once too often for my liking), and so an RF connector designed to work correctly at UHF would be a distinct advantage.

MODIFIED OPERATION

Replacing the SO239 with a BNC type can be performed without much difficulty, maintaining good appearance with efficient operation (most BNC connectors are rated at 50 ohms up to 10 GHz).

COMPONENTS REQUIRED

1 x BNC panel receptacle, type UG-290A/U (91836).

4 x 8BA nuts and bolts (no longer than 1 cm long).

MOD INSTALLATION

1. Disconnect the transceiver from a DC power supply and aerial system.
2. Remove the plastic dress surround from the ANTENNA connector on the rear panel by undoing the four screws.
3. Remove the plastic case of the FM321 by undoing the four (4) self-tapping screws.
4. Carefully unsolder and remove the shielded section inside the FM321 which covers the connections to the ANTENNA connector.
5. Carefully remove the SO239 ANTENNA connector. Do not disturb the stripline inductors and miniature capacitors with solder splashes or scratches on the PCB.
6. Mark on the rear panel the four (4) screw holes required to mount the BNC connector, so that it will sit squarely in the centre of the existing hole.
7. Very carefully drill these holes in the rear panel to take the 8BA bolts and remove all burrs and metal flakes from inside the FM321.
8. Mount the BNC connector with the flanged base outside the set. The plastic dress surround can be screwed on over the BNC, giving a neat finish.
9. Resolder the wires to the BNC connector which were originally to the SO239 type. Carefully replace and solder the shielded section inside the FM321 covering the ANTENNA connector.
10. Test the transceiver by transmitting into a dummy load and noting normal power output.
11. Disconnect any test equipment and reassemble the plastic case. ■

Woodpecker Located

Bruce Saxon VK3BWX
77 Edithvale Rd., Edithvale 3196

This is a report of a discovery which is of vital importance to amateurs operators everywhere.

Like many such great discoveries in science, the discovery of the location of the WOODPECKER was made by chance. It was just a matter of being in the right place at the right time.

Many amateur operators are convinced that the Woodpecker eminates from the USSR, and no doubt anything written here will not alter that opinion. However, the information, times, dates and general data related here are factual, and can be substantiated by eye-witness as well as photographic evidence.

On the evening of August 4th, 1980, during the coldest summer in Japan for 100 years, Bruce VK3BWX, Pam VK3NSB and daughter Rebecca were enjoying the hospitality of a group of JA3 operators. A welcoming party had been arranged by Yoshio Nakajima JA3FEG. The venue was the Heihachitei Restaurant in Hirakata City, some 40 kilometres from Kyoto, and about 30 kilometres east of Osaka.

At the close of the party it was necessary to embark upon a leisurely stroll to the car park some distance from the restaurant. The visiting VKs were to be driven back to their hotel in Kyoto.

The summer's night was clear, there was a feeling of relaxed wellbeing while savouring the atmosphere as the now reduced group made its way to the commuters' car park.

We turned a corner and there it was, suddenly, without warning, in blatant disregard for secrecy . . . proclaiming to all and sundry in eye-catching boldness . . . WOODPECKER.

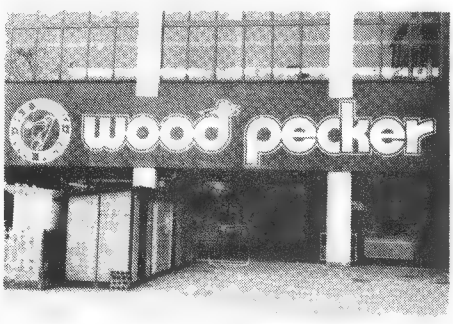
Had we discovered the lair, the very nest of the winged scourge of amateur radio? Had we stumbled on the added and alarming discovery of the unheard of proposition that the WOODPECKER had a mobile facility?

The author turned to Yoshio, his host, and said "So this is where the dreaded WOODPECKER is located . . . here in Japan . . right here in Hirakta City . . . this is your well kept secret". The inscrutable quickly changed to scrutable, there were chuckles all round as the situation was enjoyed by all.

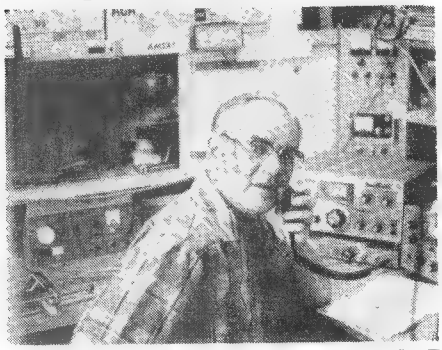
Murphy-San's Law was in operation, so no photographs were taken at that time.

In a recent QSO with Yoshio, some photographs of the WOODPECKER were requested. Yoshio readily agreed to supply the evidence and the photographs were promptly obtained. Yoshio took the opportunity to recall the look of amazement on the author's face when confronted with the WOODPECKER.

The "do it yourself" Woodpecker handyman centre is located in the ground floor of the Kuguha Station Building, Hirakata City, Osaka, Japan. ■



AMATEUR SATELLITES



R. C. Arnold VK3ZBB

SATELLITE OPERATIONS

Both OSCARS 7 and 8 continue to operate satisfactorily although the former is consistently superior and far more popular. The operating schedule for AO7 was altered during January and it is now commanded each Wednesday to operate as follows:—

Mode A (145.9 up, 29.45 down): Monday, Thursday and Saturday.

Mode B (432.15 up, 144.95 down): Wednesday, Friday, Sunday, Tuesday.

OSCAR 7 ILLUMINATION

As operators of OSCAR 7 will remember, the winter of 1980 produced a limitation of up to ten minutes in the "in sight" time of each orbit. This situation commenced in May 1980 and continued until late the following July.

I have mentioned on a number of occasions that it is virtually proven that the batteries of AO7 have failed open circuit and that all power requirements to operate the command facilities, the beacons and the transponder, are supplied directly from the solar cells. Hence a path in sunlight is necessary for operation of the on board facilities.

I have studied the relative positions of AO7 and the sun as they will be during the coming winter months and consider the "shadow effect" will be minimal this year; in fact, the restriction in operation may not be noticed.

I certainly hope this will be so — if you wish to check my computations refer to the article by Greg Roberts ZS1BI in "Amateur Radio", August 1980.

ORBIT PREDICTIONS

MARCH 1981

	OSCAR 7			OSCAR 8		
Date	Orb. No.	Eqx Z	Eqx °W	Orb. No.	Eqx Z	Eqx °W
1	28781	0115	95	15225	0036	67
8	28869	0150	104	15323	0109	75
15	28956	0029	84	15421	0143	84
22	29044	0104	93	15518	0033	67
29	29132	0139	102	15616	0106	75

"ARSENE" FRENCH RADIO AMATEUR SATELLITE PROJECT

An experimental project of the Radio Amateur Club de l'Espace (RACE) provides for the launching in 1984-1985 of ARSENE (Ariane radio amateurs satellite pour l'enseignement de l'espace), a small telecommunication satellite weighing between 100 and 120 kg, as a secondary load when a geostationary satellite is launched by Ariane.

Equipped with two multiple access repeaters and a radio beacon and placed on a highly elliptical orbit (perigee 1500 km, apogee 35800 km), it will be accessible to radio amateurs throughout the world as well as to teachers who will be able to use it for demonstrations and practical work. It should have a service life of two years.

ARSENE will be built by French radio amateurs and the students of the main engineering schools with the support of the Centre National d'Etudes Spatiales (CNES), The Office National d'Etudes et de Recherches Aerospatiales (ONERA) and the Direction Techniques des Engins (DTEN) as well as several industrial firms. Students will participate in the project by means of their third year thesis. Co-odination of the project is in the hands of a committee comprising the President of RACE, the Director of the Toulouse Space Centre and the principals of the participating schools.

RACE is an association which was set up on 20 July, 1979, to promote the study, construction, placing in orbit and operation of a communication satellite for the amateur service. When it was established, RACE consisted of 22 members, all of them radio amateur.

At the beginning of February 1980 the President of the French Republic agreed to sponsor the ARSENE project.—CNES. ■

AROUND THE TRADE

TELEX/HY-GAIN HDR-300 HEAVY DUTY ROTATOR

Adapted from QST, January 1981

In a word, the HDR-300 is **hefty.** This unit, weighing in at 27 lb. (12.2 kg), is designed to support a vertical load of 500 lb. (227 kg) and rotate an antenna with a projected wind surface area of 25 ft.^{2} (2.3 m^2) when mounted inside the tower. The antenna in use at W1SE at the time the rotator was tested was a large, six-element tribander with a 32 ft. (9.8m) boom. This 75 lb. (34 kg) antenna hardly taxed the capability of the HDR-300, which operated as if it had no load upon it.

Telex/Hy-Gain recommends that the minimum outside tower width be 11.5 inches (292 mm). The top section of the tower at W1SE is just 11 inches (279 mm). This, and the fact that the HDR-300 mounts **beneath** the rotator mounting plate, at first made it impossible to mount the rotator and have it clear the tower bracing. The job was finally done on the fourth try by **inverting** the mounting plate, permitting the rotator housing to clear the tower bracing. If one has a tower with the recommended minimum-width face, or larger, no problem should be encountered.

Control Unit

The nicely styled, functional HDR-300 control console is provided with a convenient digital readout accurate to ±1°. The 21 lb. (9.52 kg) console supplies 24V AC for the rotator motor, 5V DC for the azimuth potentiometer, and converts the analogue voltage received from this potentiometer for input to the three 7-segment LEDs that display the digital azimuth readout. Both transformers are factory wired for 117V AC, but may be re-strapped for 235V AC operation.

The manufacture does not recommend operation of the rotator at its rated capacity in winds above 50 mi/h. (80.5 km h.). However, Telex/Hy-Gain says it is possible as long as certain precautions are taken. (1) Always allow the antenna to coast to a stop before locking the brake. (2) Always keep the brake locked when the rotator is not being turned. (3) Avoid rotating near the ends of rotation. Do not depend on the limit switches to stop rotation of a large antenna in strong winds. The manufacturer also suggests that the above precautions be followed when rotating even medium-size antennas in light winds. The life of the rotator will be prolonged.

Enquiries to Audio Telex Communications Pty. Ltd., 1 Little St., Parramatta, NSW, (02) 633 4344, and at 7 Essex Rd., Mt. Waverley, (03) 277 5311, 394 Montague Rd., West End, (07) 44 6328. ■

ICOM LINEAR AMPLIFIER — IC-2 KL

Icom Japan have released the all solid state linear amplifier with a rated input power in SSB of 500 watts PEP. The same rating applies to RTTY. The linear amplifier employs recently developed high power transistors designed for SSB use in a parallel push/pull amplifier.

The IC-2KL covers all amateur bands from 1.8 MHz to 28 MHz, including 10 MHz, 18 MHz and 24 MHz bands, comprising the WARC 79 allocations.

The IC-2KL employs "heat pipe cooling system" for the power transistors. The heat pipe system is new technology, allowing very high heat conductance which is several hundred times that of copper and giving much quicker response. The size of the linear is in keeping with the popular IC720 and is 111 millimetres high, by 241 millimetres wide, and 300 millimetres deep, with a weight of 7 kg. The linear requires the companion power supply, the IC-2KLPS, which provides an output voltage of 40 volts DC with an output current of 25 amperes. The size of the power supply is the same as that of the linear and has a weight of 14 kg.

The linear allows automatic band switching and a no-tuning up operation. This facility is only available when used with the IC720. The transceiver puts out a

band switch control signal and the appropriate bandpass filters and other circuitry follows the transceivers band positioning automatically.

With a linear amplifier of this type handling such high power, several protection circuits are incorporated to activate ALC control voltage to reduce driving power and/or shut off the amplifier to protect transistors. Protection functions against mismatching, overheating, overcurrent, over-driving, over-output power and any unbalance resulting in the PA amplifier units.

The driving power required is between 50 and 80 watts and the linear puts out a negative control voltage for ALC.

Theory of operation

Input from the transceiver goes to a power divider for each PA unit, with the output level balanced and an impedance of 50 ohms. The PA unit consists of two amplifier modules and a cooling fan, with each amplifier push/pull circuit capable of handling 250 watts output power. An input frequency correction network and RF negative are employed to give flat gain response of better than ±1.5 dB across the band.

The PA unit has two thermal sensors with the first turning the cooling fan on when the temperature of the heat sync. exceeds 50°C and the other turns it on when the temperature exceeds 80°C and also controls the protection circuit.

The output from each RF power amplifier is fed to a power combiner which provides the 500 watts of RF output power. If either of the PA modules become unbalanced a control signal is generated to the protection circuit to shut down the PA amplifier.

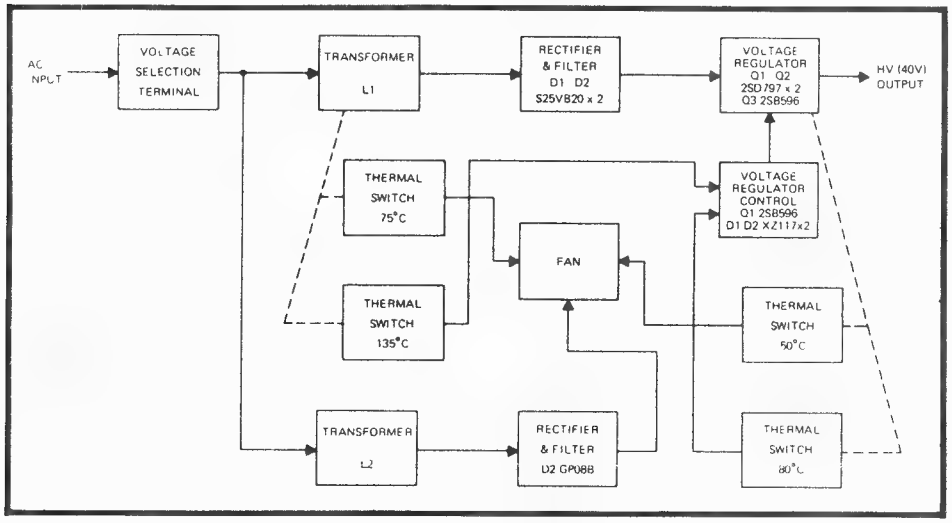
Protection circuits

The protection circuits comprise four comparators and power supply switching circuits, and detect operating conditions of the unit and control the ALC voltage according to these conditions. If operating conditions become abnormal the power supply will be shut off and the unit protected from damage.

Power supply IC-2 KL PS

The power supply provides 40 volts, ±3, with a capacity of 25 amps maximum. It is a regulated circuit and provides protection circuits with controlled cooling fans which shut off the unit, if the output voltage rises above 40. The power transformer has two thermal switches, the first closing at 75°C, turning the cooling fans on, and the other closes at 135°C and shuts off the output voltage. Reference to the block diagram for both the IC2KL and the IC2KLPS power supply will assist in understanding the function of this rather unique and state of the art amateur accessory for the 701/720 series transceivers.

Further information and pricing is available from the Australian distributors, Vicom International, Melbourne, phone 699 6700, or their Sydney office, phone 436 2766. ■



IC-2KL Power Supply.

ICOM HF TRANSCEIVER — IC-720A

The Icom Company of Japan have now released an improved version of the IC-720 transceiver designated the IC720A. Although external appearance is exactly the same as the 720 version, numerous technical improvements have been made to the circuitry to give better performance, with special emphasis on frequency synthesis and the noise blanker.

Criticisms of all units have been that they are rather selective when it comes to the type of noise than can be effectively dealt with. Of great concern in many countries of the world, including Australia, has been the intrusion of the "woodpecker" which puts undesirable pulses on both the 14 and 21 MHz band. The noise blanker in the IC-720A has been reworked to provide effective suppression of the ignition noise as well as woodpecker pulses.

Improvements have also been made in the frequency synthesis department and the already low level of spurious outputs have been reduced even further to almost acceptably professional specifications.

Unlike some competitors' transceivers, the IC-720 can transmit continuously for up to 10 minutes with full output .If continuous transmission is required for greater than 10 minutes, the output power is recommended to be reduced to approximately 70 per cent of the full power.

Provision for transverter connection is available and an output level of 150 mV across 50 ohms is available for receive from a transverter. An input signal of 1 mV can be used and by applying transverter mode control signals to pins on the accessory socket. The frequency display will also read out the receive frequency on the bands 50 MHz, 144 and 430. Input/output frequency from the transceiver is within the range of 20-30 MHz, depending on the band desired.

A memory back-up power supply is also available which will enable the same frequency to be displayed when next the transceiver is used. Further information on this transceiver can be obtained from the Australian Distributors, Vicom International, at their Melbourne office, 699 6700, or Sydney office, 436 2766. ■

INFRA-RED CORDLESS MICROPHONE FOR TWO-WAY RADIO

The Daiwa Industry Company Limited of Japan have released through their Australian agents, Vicom International, a cordless electret microphone utilizing high output infra-red diodes as a method of transmission. The microphone is intended to hang around the operator's neck, pendant fashion, and allow the operator unencumbered use of the steering wheel while using his two-way radio.

Modulated infra-red signals emitting from the light emitting diodes on the microphone are received by one or more infra-red sensors, strategically placed inside the vehicle. The signal from the sensor is then fed into the Daiwa demodulator, which in turn feeds a standard audio signal into the microphone socket of your two-way radio. The design allows the RM940 receptor to double as a charger for the nicads in the microphone and a holder for the pencil-like electret microphone when not in use.

Operation of the "soft touch" PTT switch on the electret microphone operates the two-way radio in the same manner as any other microphone. To alert the operator that you are transmitting, a short duration audio tone is emitted from the receiver unit.

Easy installation and low price combine with convenience of operation for making this unit an extremely popular purchase for a mobile two-way radio operator.

Full details are available from Vicom International Pty. Limited, 339 Pacific Highway, Crows Nest (phone 436 2766), or the Melbourne office, 68 Eastern Road, South Melbourne (phone 699 6700), or any of Vicom's many reputable dealers. ■

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18-AVT/WB-10.80m Trapped vertical antenna	$119
TD2 Western trapped dipole 80-15m (will operate on 10m with ATU)	$79

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Model HK-808: Heavy duty commercial hand key with full ball race pivots, heavy marble base and dust cover. The ultimate hand key. Price: $79

Model HK-701: Heavy Duty De Luxe Hand Key, fully adjustable, ball bearing shaft, plastic protective cover. Mounted on heavy non-skid poly marble base. Base dimensions 168mm x 103mm. Price: $40

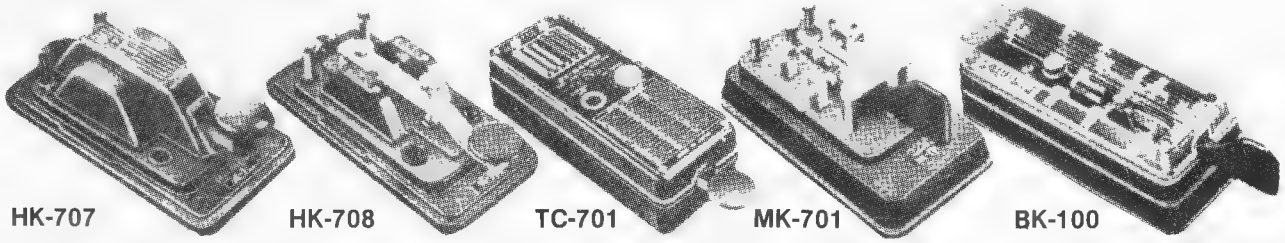
Model HK-707: Economy hand key in all black ABS resin, metal parts protected by moulded AVS resin cover. Price: $20

Model HK-708: Similar to HK-707 but without cover and with smart chromium plated keying mechanism and flat American style knob. $16.50

Model TC-701: Morse practice oscillator with built in key and speaker. Including battery and earphone. Copy of morse code on case. Two can be wired together to form a practice communication set. Price: $19

Model MK-701: Manipulator (side swiper) for an electronic keyer. Accurate and restful keying operation are assured owing to a heavy metal plate and a frictional rubber belt beneath the periphery of the main base. Price: $40

Model BK-100: Semi-automatic (bug) key, with standard adjustments, wide speed range, protective plastic cover, on heavy non-skid base, beautifully finished. Base dimensions 175mm x 75mm. Price: $49



HK-707 HK-708 TC-701 MK-701 BK-100

EMOTATOR ROTATORS

103SAX Medium Duty, disc brake, circular dial	$189.00
502SAX Heavy Duty, disc brake, circular dial	$265.00
502CXX Heavy Duty, disc brake as illustrated	$259 00
1102MXX Heavy Duty, mechanical brake	$389.00
1103MXX Extra Heavy Duty, high turning torque	$403.00
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1215 Mast clamp for 1102/3	$49 00
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V. K. ELECTRONICS	(004) 31 1708

And other regional centres.

AWARDS COLUMN

Bill Verrall VK5WV
7 Lilac Avenue, Flinders Park, SA 5025

Here is a list of WIA Awards issued during the period 1st July, 1980, to 31st December, 1980, and the top DXCC tallies, new members and amendments as at 31st December, 1980.

WAVKCA AWARD

Cert. No.	Callsign	Cert. No.	Callsign
865	DJ2MN	894	UA9PP
866	JA6IP	895	RA3AKX
867	JH7MSQ	896	UA0JAW
868	HB9AIJ	897	GM4CNF
869	JF1KKV	898	JA1SXH
870	JH7JGG	899	F5RS
871	JA1AJK	900	AG5X
872	JA1NLX	901	ZS5CO
873	JA4LAZ	902	VS5MM
874	JA5JGY	903	WA6PJR
875	JA3ANW	904	PA0WRS
876	JA6JNF	905	GM3GJB
877	JA5BSQ	906	ZS5FV
878	JK1NLS	907	4X4FU
879	OK1AEH	908	JR1FVW
880	JA1UTQ	909	JA1AZS
881	WD4RCO	910	JH6BZI
882	SM5HPB	911	KG4WM
883	W1AGA	912	SM6CTQ
884	G3YNC	913	YB0WR
885	JA3APL	914	DA1MV
886	JA1EF	915	EA7PW
887	KB8JF	916	SM4KL
888	ZS2PZ	917	W2MIG
889	UA0NR	918	W1DMD
890	UF6VAG	919	JH4PRU
891	UK6LKP	920	JB2XJO
892	UA4CZ	921	JA2KSI
893	UR2FQ		

WAS (VHF) AWARD

Cert. No.	Call Sign
78	VK3AKK plus 14 additional countries. (amendment)
100	VK3AMK plus 15 additional countries. (amendment)
128	VK3AWY plus 11 additional countries. (amendment)
133	VK2BHO.
134	HL9TG.
135	VK3BDL plus 4 additional countrie
135	VK3BDL plus 5 additional countries.

WAVKSA (VHF) AWARD

Cert. No.	Call Sign
14	VK2BHO.
15	VK3BDL.

HAVKCA (SWL) AWARD

Cert. No.	Call Sign
49	L30848, Mark Stephenson.
50	SWL-VK1, Barry L. Bennetts.
51	UA9-084-200, Andrey G. Korpachev.
52	L50355, Robert Duncan.

DXCC — TOP LISTINGS
(All at 275 and over)

PHONE

Call Sign	Tally	Call Sign	Tally
VK6RU	317/362	VK4PX	295/310
VK5MS	317/359	VK3AHO	294/326
VK4KS	316/348	VK7DK	294/309
VK5AB	315/345	VK5WV	294/306
VK6MK	312/349	VK2APK	293/313
VK4FJ	306/343	VK4UC	293/306
VK6LK	302/316	VK4AK	289/298
VK3JF	300/312	VK3AKK	289/291
VK4RF	300/310	VK3AT	288/289
VK7LZ	298/315	VK5XN	285/298
VK4VC	298/309	VK7AE	282/284
VK3AMK	296/305		

CW

VK2QL	309/347	VK3AHQ	299/331
VK2EO	309/346	VK2APK	283/304
VK3YL	305/336	VK3YD	281/313
VK4FJ	302/345	VK4RF	275/296

OPEN

VK6RU	317/362	VK3AMK	296/305
VK4SD	317/348	VK7DK	295/310
VK4KS	316/352	VK3AHO	294/326
VK3YL	314/346	VK2SG	293/311
VK4FJ	312/356	VK3OT	291/292
VK6MK	312/349	VK3AKK	290/292
VK4RF	308/332	VK4AK	289/299
VK3JF	308/328	VK7BC	284/288
VK4PX	302/321	VK5RX	282/313
VK2APK	301/329	VK2AHH	279/305
VK7LZ	300/332	VK3XB	278/306
VK4UC	296/310	VK4DP	278/287

DXCC — NEW MEMBERS

PHONE

Cert. No.	Call Sign	Tally
232	VK2DEJ	157
233	VK2NNI	106/107
234	VK3NSR	155/156
235	VK7NFR	100
236	VK2VDR	103
237	VK6NDE	103/104
238	VK3VU	139
239	VK2BNN	107/108
240	VK3ADT	100/101
241	VK6AJW	101
242	P29RP	101/102
243	VK8NRI	105
244	VK2BQN	109
245	VK3VHA	106
246	VK3NXX	111
247	VK2VUQ	100
248	VK3TD	106/107
249	VK3NIO	103/104
250	VK2VPN	105/106
251	VK3VDW	108

NOTE: Certificate No. 247 is endorsed "All contacts made from mobile station", quite a commendable effort by Phil Greentree.

CW

112	VK4XA	211/21

OPEN

188	VK3BFD	104/105
189	VK5BO	191/213
190	VK5ARA	110
191	VK3ADT	102/103
192	VK6NDJ	103
193	VK5NJR	110/111
194	VK3TD	107/108
195	VK6NAT	150/151
196	VK3LG	98/103
197	VK3OT	291/292
198	VK3OV	104/105
199	VK3AKK	290/292

RTTY

1	VK2SG	100/101

DXCC — AMENDMENTS

PHONE

Call Sign	Tally	Call Sign	Tally
VK2FD	182/183	VK3VGD	160/161
VK3DU	263/265	VK4BG	245/255
VK3GB	205/223	VK4ABM	205/206
VK3RF	257/259	VK4AMB	229/230
VK3ACD	272/285	VK5OU	235/236
VK3AJJ	198/199	VK5RX	267/270
VK3AWY	222/223	VK5NVW	123
VK3BLN	198/199	VK6YL	250/251
VK3NDY	231/232	VK6NAT	149/150
VK3NOA	192/193	VK6NBU	145/146
VK3NOL	169/170	VK7BC	266/269

CW

VK3JF	217/231	VK5RX	203/234
VK4LV	137/143	VK7BC	131/132
VK4PX	104/112		

OPEN

VK2NOG	152/153	VK3NDV	233/234
VK3ACD	272/286	VK3NOA	200/201
VK3AJJ	201/202	VK4BG	259/272
VK3BLN	203/204		

■

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1.16	½	16	3	No. 3003	$1.20
2.08	⅝	8	3	No. 3006	$1.45
2.16	⅝	16	3	No. 3007	$1.45
3.08	¾	8	3	No. 3010	$1.70
3.16	¾	16	3	No. 3011	$1.70
4.08	1	8	3	No. 3014	$1.90
4.16	1	16	3	No. 3015	$1.90
5.08	1¼	8	4	No. 3018	$2.10
5.16	1¼	16	4	No. 3019	$2.10
8.10	2	10	4	No. 3907	$3.15

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Reference: A.R.R.L. Handbook, 1961
Willis Pi-Coupler Unit — $29.00
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Phone 836 0707

Ron Wilkinson Achievement Award 1980

Details of this annual Award were set out on page 17 of AR for March 1978. The Award is funded from interest received from a most generous donation received from Mrs. Mary Wilkinson, widow of the late Ron Wilkinson VK3AKC.

For the year 1980 the Executive received four nominations. After careful evaluation it was decided that Cecil Bardwell VK2IR should receive the Award. He was nominated by the President and entire Divisional Council of the WIA, NSW Division. He had given the Division 20 years of service in the provisions of AOCP education classes both by personal lectures and the conduct of the correspondence course which in fact is Australia-wide. He will continue to conduct the correspondence course and will supervise the personal lecture classes. During this period "Ces" presented 1436 actual lectures in person to 21 separate classes and his untiring efforts have also received recognition by the WIA NSW Divisional Council.

Congratulations Ces. ■

Athol Tilley VK2BAD (left) congratulates Ces on the Award.

MOUNT GAMBIER AMATEUR CONVENTION

Plans are once again under way for the 17th Annual South-East Radio Group Convention to be held in Mt. Gambier on the Queen's Birthday long weekend on June 6-7-8th. Due to the record crowd in 1980 (around 250 people, which included some 130 call signs), a much larger venue has been booked, namely the main pavilion at the Mount Gambier Showgrounds, in anticipation of an equal ro larger attendance.

The usual events, including various scrambles and fox-hunts and hidden transmitter hunts, will be held, plus several new events and, as usual, extensive exhibits of all major brands will be represented.

Prizes will be awarded to winners of all events, plus the South-East Radio Group Perpetual Trophy awarded for the best overall performance. Bevan VK5TV has won this trophy in 1979 and 1980, and will be trying for a hat-trick in 1981.

As the South-East Radio Group is celebrating its 21st birthday this year, a special dinner is being arranged on the Saturday evening of the Convention.

Any person who has not been to a Mount Gambier Convention in recent years and wishes to attend may obtain a registration form from the Convention Registrar, C/- ERG, PO Box 1103, Mount Gambier, SA 5290. ■

TECHNICAL CORRESPONDENCE

LARGE ANTENNA GYRATING INHIBITOR

Dear Sir,

Near the top of the list of aversions outside the control of the amateur operator must surely be strong winds, especially if he operates with a large antenna.

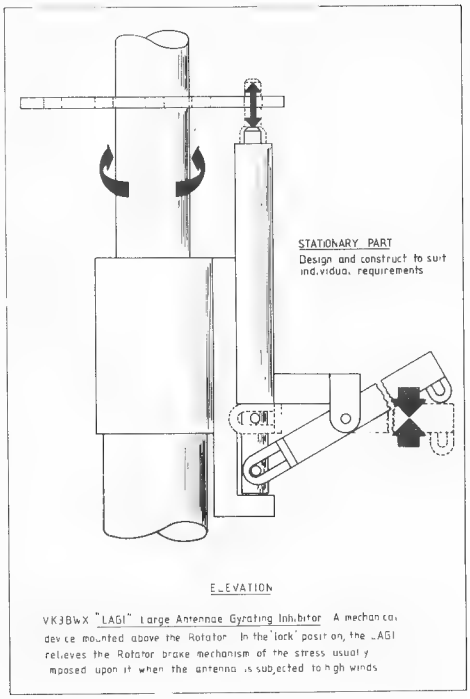
This operator's QTH seems to be located directly in the path of sudden winds which blow very strongly in short bursts, usually at inappropriate times. All calculation indicate that the Emotator 520 CXX should be capable of handling a 3 el. mono yagi on 10m and a 4 el. duo bander for 15 and 20, all without traps and having full length elements. Intuition tempered with fear tells me that if the brake on the rotator was allowed to be subjected constantly to the stress placed upon it by the leverage of the long elements during a strong wind, then, beginning with a gentle yawing action, the whole array would very soon exhibit the characteristics of a weather-vane..

The "LAGI" was installed so that the array could be locked in a position which would present the least wind surface during a storm. It may also be locked on that preferred beam heading at times of strong winds.

I am convinced that the Lagi has on two occasions prevented the internal mechanism of the 520 CXX from resembling the product of a domestic food blender.

The diagram is not meant to be a detailed working drawing, but rather an illustration of the concept. The circular plate with the holes would need to be in two halves, with a saddle welded to each half and then bolted together around the rotating pipe. The stationary part would need to be made to suit the requirements of the individual.

The material for the BWX Lagi was by tradition obtained from the nearest scrap metal dealer.

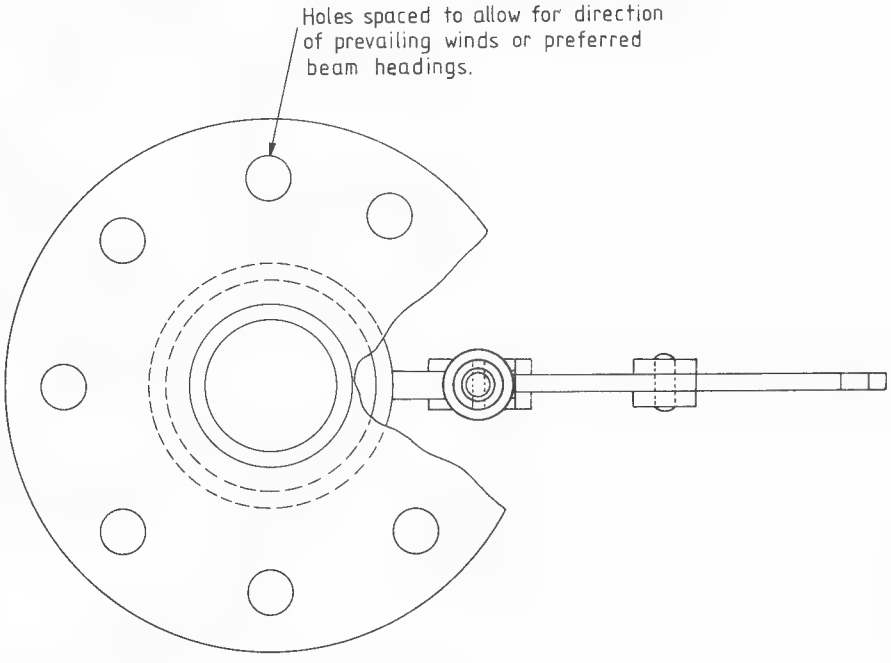


VK3BWX "LAGI" Large Antennae Gyrating Inhibitor A mechanical device mounted above the Rotator. In the 'lock' position, the LAGI relieves the Rotator brake mechanism of the stress usually imposed upon it when the antenna is subjected to high winds

Manipulation of the device is by means of two ropes (rods or cables); pull one rope on the lever to shoot the pin into the hole; pull the other rope from the bottom of the pin to release the lock.

Oh yes, it is a good idea to devise something at the rotator control so that the rotator cannot be activated when the Lagi is in the locked position . . . it will not turn when it is locked.

Bruce Saxon VK3BWX. ■



VK3BWX "LAGI" inhibits the gyrating effect of large antennae when subjected to strong winds

NOTES ON THE PREDICTIONS

The mode of propagation used by IPS in compiling their predictions are reflected in the bar charts used to convert the Graflex symbols into a graphic picture

When generating the Graflex charts (reproduced in a number of publications) the following symbols are used

1. "." — Propagation is possible but probably less than 50% of the days of the month.
2. "%" — Propagation is possible between 50% and 90% of the days of the month.
3. "F" — Propagation is possible by the first F mode on at least 90% of the days of the month unless there is a severe ionospheric disturbance.
4. "M" — Propagation is possible by both first and second F modes. The strongest mode is normally the first mode, but the vertical aerial pattern may influence the mode received.
5. "A" — High absorption, i.e above the absorption limiting frequency but probably too close to it for good communication.
6. "X" Complex mixtures of modes including the second E mode.

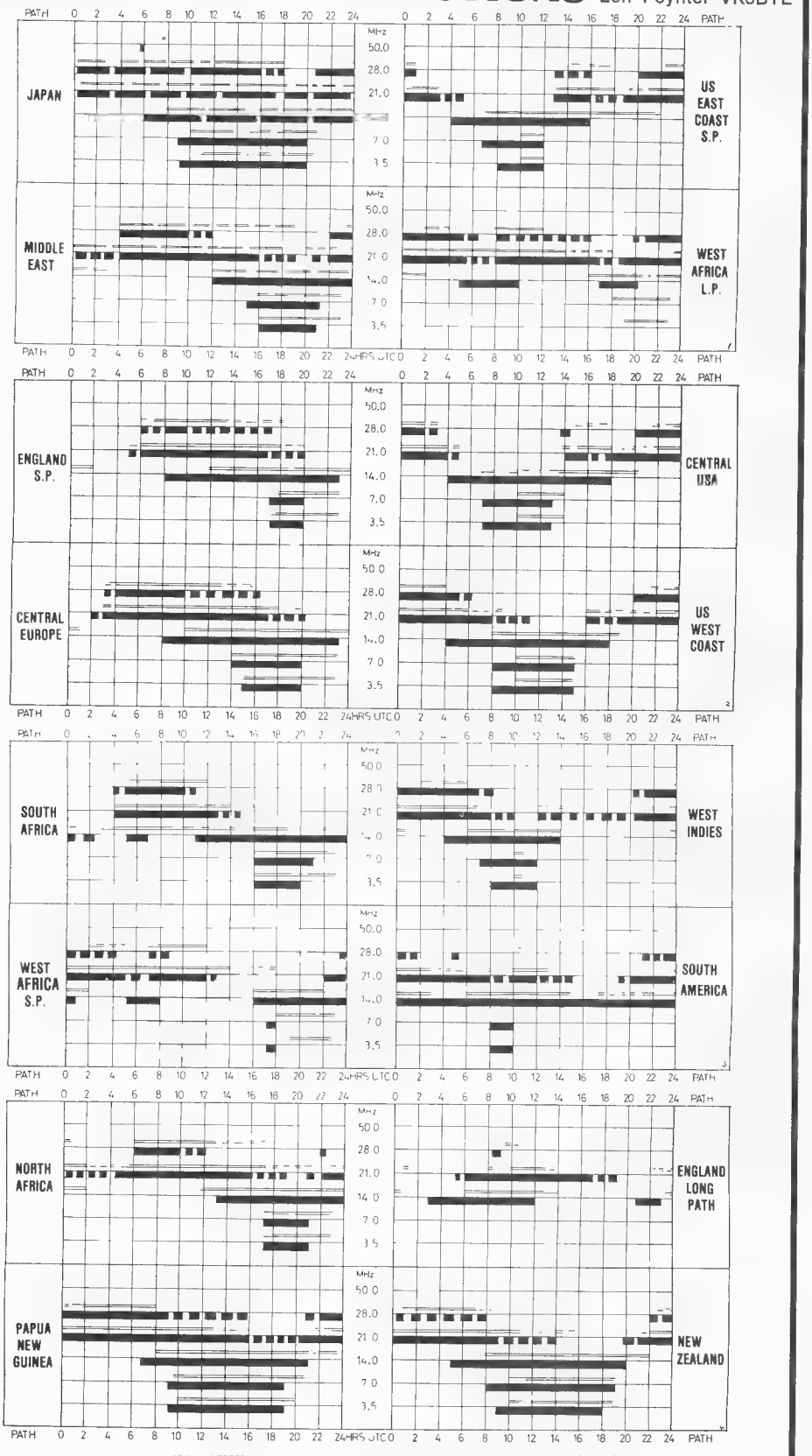
These are the most significant types we encounter The full lines or bars on the chart cover 2 3 4 taking 5 into account The broken lines or bars are depicted by 1. 6 is extremely hard to verify and is not taken into account

The paths from Eastern Australia are based on Canberra. The paths from West Australia are from Perth Suitable allowance should be made on Eastern paths for geographical differences. Times, as much as 1 hour difference between Victoria and Queensland in band openings occur. Often there is no signal available in one State, whereas the opposite effect occurs in the other State, they get the lot Marginal differences produced by layer tilt and varying degress of ionisation can be very frustrating.

Generally the predictions show that time of day when the path should be open between the two areas. All other factors notwithstanding. ■

IONOSPHERIC PREDICTIONS

Len Poynter VK3BYE



Predictions courtesy Department of Science and Environment IPS Sydney.
All times universal UTC (GMT).

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Photographs for AR

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SILENT KEYS

It is with deep regret that we record the passing of —

Mr. G. T. MILES	**VK2KI**
Mr. A. J. TURNER	**L20990**

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

43 Boyana Cres., Croydon 3136
7th January, 1981

The Editor,
Dear Sir,
Radio Amateurs should not have to pay tax on components. At present, we are slugged up to 27½ per cent on components which are to be used in private home construction projects. It is in the interests of the Australian community that technical prowess in radio matters be actively encouraged, not discouraged, by a heavy tax. The greater amount of home-building today is done by the younger, enthusiastic amateurs with little money. In time of war, these same people would find themselves in some signals unit contributing skills won at considerable cost to themselves.

In the event of an emergency, our equipment and skills may be commandeered by Government Officials for the good of the community. What a cheek, if the owner has built a clean, efficient station at 27½ per cent tax!

Today, all sorts of people in business are obtaining tax "perks" for the most incredible reasons. Surely it is not unreasonable to ask that the tax on components used in private amateur projects be removed.

Yours faithfully,
Drew Diamond VK3XU. ■

St. Vincent's Hospital
15/1/1981

The Editor,
Dear Sir,
I would like to convey the thanks of myself and the patients in St. Paul's Ward in St. Vincent's Hospital to Bill VK3YZI publicly through AR for his kind gesture in donating a lovely fan for the comfort of myself and the patient's of St. Paul's Ward.

Bill delivered the fan on the 14th January to St. Vincent's Hospital all the way from Gembrook. The temperature this day was 42 degrees. This in itself was a wonderful gesture at the discomfort of himself travelling on such a hot day for the comfort of others, which makes Bill a great ambassador for WIA.

J. P. Watts VK3YZW. ■

23 Falcon Rd., Macleod 3085
Phone 459 6445

The Editor,
Dear Sir,
I just received a letter and cheque from you for article, the DJ4LB ATV transmitter as a basis for a 70 cm SSB transverter. I would like to point out, as given in the corrections, June AR, that this article was also written by Neville Darrach VK3YDR. Both Neville's and my name appeared on the original manuscript, but for some reason was never printed as such.

After speaking with Neville we both agreed to use the money on the new Melbourne 70 cm beacon VK3RAI. We are still waiting for some components but it is hoped to have this beacon operational soon.

Please thank all concerned for the award and I assure you that the money will be put back into the hobby for the benefit of others as well.

Yours faithfully,
Ian Glanville VK3AQU. ■

12 Ervin Rd., Kilsyth, Vic. 3137

The Editor,
Dear Sir,
My subject is one which must, above all else, have occasioned fury, depression, paranoia and probably, on occasion, the desire to end it all with a length of suitably knotted coax and a stout branch on a convenient tree.

I refer to the gain antenna and, more particularly, the erection of its attendant tower.

This letter does not refer to the technicalities or the manpower involved. During my short time among the ranks of novice operators I believe I have made more than enough friends to assist in construction and in the erection of a tower so vast that it would rival the mightiest in the land — well almost.

The problem lies in the attitude of the multitude of civic authorities and conflicting municipal edicts which are so much at variance with one another that the average operator, wishing only to raise a support 30 odd feet above ground and with a vested interest in the edifice staying there, could be forgiven for believing that he had been transported back to the fragmented states which preceded the German nation during the 18th century rather than inhabiting a land of modern democratic principles — in this case dubious tenets to say the least.

Having vented my spleen I arrive at the point.

1. Among the many amateur operators of this country there must exist those learned at law and others with a deep knowledge of municipal regulations.
2. It should be possible, given the will, for such a group to convene and produce a reference listing past test cases and arguments relating to the subject.
3. Such a reference could be made available by the Institute for a reasonable price for the use of any member desperate enough to resort to legal argument and would supply his representative with information which he might logically hesitate to assemble himself having regard to the cost involved.

Such an organisation exists in the United States and, whilst I am not aware of their success rate, I feel that they must have assisted many operators in achieving full enjoyment of their hobby while not interfering to any degree with the rights of others in their vicinity.

Self interest does not prompt this letter — I have a tower. It is in the knowledge that there are many amateurs in Australia grappling with the problem that I put this suggestion forward for consideration and, hopefully, feedback.

Yours faithfully,
N. W. Fairweather VK3VFQ.

EDITOR'S NOTE:

All Divisions provide a free advisory and, if the circumstances warrant, a free legal service to members who run into municipal problems.

The WIA has many documented cases which have been won through various appeals to planning authorities, etc. ■

The Editor,
Dear Sir,
I wish to correct a statement attributed to me in a letter to you (AR December 1980, page 53) from Neil VK6NE.

My statement to the 1980 Federal Convention was "That I spent 200 hours during the first four weeks after the RD contest on the preliminary work". I am unable to estimaet the total time spent on the whole of the log checking.

However, being a progressive amateur and Contest Manager, I use a microprocessor to do the larger part of the tedious checking and this allowed me to process the 1980 "RD" logs in record time.

It would be prudent for Contest Managers to arrange rules and log formats to fit in with modern data processing and so fall into line with paragraph 3 of "The Amateur Code" as published in the ARRL Handbook — "The Amateur is Progressive".

Wally Watkins VK2DEW,
Federal Contest Manager. ■

31 Helms Court, Benalla 3672
22/12/1980

The Editor,
Dear Sir,
Over a period of time there have been a number of letters in this and another amateur radio magazine critical of the lack of help and courtesy expressed by experienced amateurs to newcomers to the hobby. Now many of these comments may be true, and also it may be true that some of the new amateurs by their "know it all attitude" have bitten the hands that may well have helped them. Faults probably lie on both sides, but also I can assure our readers that there are those amateurs who do do their best to help others.

A few months ago I put an advert in Amateur Radio and Amateur Radio Action asking for assistance to help equip a newly qualified novice in the Benalla area. I said that he was a penniless new novice. The lad concerned is Ray Thaus VK3VVE, a 4th form technical student, who lives on a small property a few kilometres out of Benalla. He has no income and is not in the position, living out in the country, to earn money on paper rounds or the like.

I had several phone calls and several letters offering equipment at extremely reasonable prices, although most of these were outside Ray's financial means. However, some kind amateurs also offered equipment gratis, and Ray is negotiating with them on methods of transporting the equipment to Benalla. Hopefully by the time this is in print Ray should have the equipment and be on the air. He is a technically inclined lad and should learn quite a lot through commissioning this equipment.

I say thank you to those amateurs who answered my request — you have helped a new young novice along the road to amateur radio. Amateurs helping the newcomer is not dead.

Best regards,
Rodney Champness VK3UG. ■

A letter from Terry Robinson L31105, who has RTTY Rx gear, complains about interference to amateur RTTY stations on 40m by phone stations and suggests segments for RTTY, etc., on amateur bands. Terry, this is done by agreement amongst amateurs, please see page 24 in the WIA 1979 Call Book. The RTTY frequencies actually in use may not coincide with those shown in that Call Book and in any event depend to some extent on international custom amongst amateurs. ■

16 Gari Street, Charlestown, NSW 2290
14th January, 1981

The Editor,
Dear Sir,
Objection has been made to a statement which appeared over my signature in the November 1980 issue of AR on page 32. The statement objected to occurs within the sentence: "But Mr. Bles apparently . . . will be affected."

I withdraw the statement complained of, which was made in error, and apologize to Mr. Arie Bles VK2AVA over this matter.

Yours faithfully,
Colin Yates. ■

HAMADS

- Eight lines free to all WIA members. $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Repeats may be charged at full rates.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means address is correct as set out in the WIA 1979 Call Book.

FOR SALE

Info-Tech 300 Keyboard, M-200E decoder, half price, $650; VDU to suit, $85; Leader LSG-11 signal generator, $65; 2.5 amp power supply, $20; model 7 and model 9 ATU, best offer. VK3NPA, QTHR. Ph. (050) 92 1024.

Kenwood TS820, CW filter fitted, hand mic., instruction manual, original packaging, little use, $740; VFO 820, never used, $110. VK2NJX, QTHR. Ph. (02) 871 2945.

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Rx, DX300 Wadley loop circuit, digital readout, in good cond., with service manual, $275; or will trade Kenwood TS120 either S or V model, with cash adjustment. Peter VK2VIY, QTHR. Ph. (066) 62 2460.

FT101E Txcvr, 2½ yrs. old, with spare driver and final tubes, 250 Hz CW filter, spare RF board, service manual, etc., $575; FV101B, 18 months old, little use, $100. Will separate if required. VK3DL. Ph. (03) 489 4954 after 9 p.m. daily.

Home Base/Mobile Station: Heathkit SB101 Txcvr, with up-dates to SB102, CW filter, 10 to 80m, as new; included with above: Heathkit CB640 external VFO, Heathkit HP23A 240V AC power supply, solid state, Heathkit 12V DC power supply, solid state, for mobile, connecting cables, manuals, $400. VK2DA, QTHR. Tel. (02) 94 1039.

Deceased Estate, late VK2ADE: Kenwood TS520 Txcvr, Kenwood VFO 520 ext. VFO, cables and manuals, $650. Mrs. F. N. Leverrier. Ph. (02) 407 2758.

Equipment owned by former VK4ADD: FT101B Txcvr, Yaesu, $500; Yaesu dummy load wattmeter, $85; Oskerblok SWR-201 SWR and power meter, $60; 3-way coax switch (manual), $5; morse keys at $5 each. Mint cond., all boxes and manuals included. Mrs. Sutherland, 34 Ashbourne Tce., Labrador 4215, at the Gold Coast. Ph. (075) 37 1109.

Kenwood TS600 all mode 6m Txcvr., in perfect cond., $575, ONO. Lionel VK3NM. Ph. (03) 88 3710 Home, (03) 568 2733 Work.

FT301D, mint cond., with handbook, $580; 100W lin. 15-6m, $90; multi-7 146 unit, $180. VK2AJY. Ph. (043) 96 4553.

Vicom IC202 SSB Txcvr, with Oscar crystal, manual and original carton, $170, ONO. VK2BY, QTHR. Ph. (080) 3484.

IC701, incl. PS, imm. cond., $995; N. Stilwell VK3ACN, QTHR. Ph. (054 42 1288 Bus., (054) 43 7592 Private.

Bound Copies QST 1930 and 1931, good cond. (2), also ditto Amateur Radio 1933-35 and 1937-39, covers water soiled (2), all or singly, no reasonable offer refused. VK3RJ, QTHR. Ph. (03) 89 6141.

TH3JR Beam, with balun, in v.g. cond., $130. VK3NWZ. Ph. (03) 435 9770 AH.

Antennas: Hy-gain TH60XX triband yagi, $200; Cushcraft ARX2 2m vertical, $20; both only 3 yrs. old, v.g.c. John Tilley VK1FT, QTHR. Ph. (062) 86 2364 AH, (062) 80 6481 Bus.

Icom IC551 6m, IC251A 2m Txcvr, linear 2m 10W-20W with pre-amp., Swiss quads, 2m, 6m, 10m, 15m, HF Alpha 374AE linear, yagi 2m 16 el. 20 ft. beam, all as new. VK3ADR. Ph. (03) 240 1231 Bus., (03) 509 8637 AH.

SWLs: The "Southern Cross DX Club" has the latest news from the SW, MW and amateur bands in our monthly "DX Post". Subscription $8 per year, students and pensioners $6 per year, and $2 joining fee, first year only. For a **free** "DX Post" write to Membership Secretary, Grantley Williams, 19 Wicklow Ave., Athelstone, SA 5076, mentioning this ad.

Leader LSG-11 Sig. Gen., perfect cond., $50; aircraft compass receiver BC433C, with control unit, solid state supply, speaker, loop, manual, 142.5 kHz IF, coverage 200 to 1500 kHz, ideal for QSer or broadcast band DX reception, $65; 135 mm Tanimex tele-lens, $25; Universal movie splicer, $10; Seconic leader exposure meter, $10. VK3AHG, QTHR. Ph. (03) 288 2024.

Kenwood TS120-V, new cond., complete with accessories and instruction manual, best reasonable offer, Sydney area sale preferred. Ross Treloar VK2BPZ. Ph. (02) 239 5267, office hours.

Ham's Home for Sale at Barmah, on Murray, 6 yrs. old 2-storey masonry brick and timber, 24 squares, self contained flat included, 3 showers, 3 toilets, 3 air-conditioners, floor coverings and drapes, 40 ft. steel tower, TH3, 9 element yagi, 2m rotator, all antenna systems serviceable, vendor finance available, must sell, moving intersate, $39,500. Ph. (058) 69 3283.

Heath SB-200 Linear Amplifier, exc. cond., little used, $500. VK2AGZ, QTHR.

ICOM IC202, exc. cond., $190; 3 el 52 MHz yagi, folds up, $10. VK4ZNC, QTHR. Ph. 52 2954 Bus., 205 2121 A.H.

SE502 Txcvr, Katsumi speech compressor and mic., good cond., 28.1 MHz to 28.6 MHz in 23 channels, modified to tune ±3 kHz (VXO), inbuilt SWR meter, low SSB, ideal for novice, the lot $155. VK2DDH, QTHR. Ph. (048) 71 1953.

Transverter, 3.5/27 MHz, $90; converter (Rx only), 3.5/27 MHz, $30; marine radio, 7 ch. PLL, $110; marine base aerial, 27 MHz, $40. Nom VK6NOR. Ph. (09) 276 3000.

ICOM IC22A Rptr, ch. 2, 3, 4, 5, 6, 7, 8, simplex 37, 40, 42, 50, 53 built into handbag, complete with 5/8 wave ant. and nicad batt., also mobile cradle, $140. VK1ZAS, QTHR. Ph. (062) 51 3711 Bus.

Swan Astro 150, complete with 20 amp PSU and mic., brand new, $825. VK5FR, QTHR. Ph. (08) 295 2331.

DC200, 12V DC power supply for FT200, with cables, $145. VK1BE, QTHR. Ph. (062) 81 3301.

Yaesu FT101E plus MC50 mic., $500. VK4NOD, QTHR. Ph. (077) 43 5668.

QST, most copies 1926 to 1977; CQ and 73, early 1960s onwards, many in binds, plus early books, mobile and antenna manuals, etc., many are rare copies; a lifetime of circuits for library or historical collection, approximately 3½ cwt. total weight, $150. Bill Sides VK3YBS, QTHR. Ph. (03) 561 4961.

Uniden Model 2020 HF Txcvr, 240V AC or 12V DC operation, digital/analogue dial, 180W PEP input, 6156B finals (plus spares), 80 to 80m operation plus the old 11m band and WWV on 10 MHz, complete with mic., owner's handbook (including novice conversion information), workshop manual, calibrated homebrew external VFO, all in good cond. and a bargain at $400, ONO; Yaesu FT-221 all mode 2m Txcvr, 240V AC or 12V DC operation, complete with mic. and full set of crystals giving the 50 kHz channels (the VFO covers the remainder), including handbook, price $450. VK3APA, QTHR. Ph. (07) 59 6965.

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Kyoguto FM 144-10SXR11 2m FM 800 channel synthesised Txcvr, exc. cond., $220; Kenwood MC50 desk mic., in original box, virtually brand new, $35. Steve VK3JY, QTHR. Ph. (03) 836 3841.

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BC22I Frequency Meter with mains supply, $25; teletype model 15, good working order, with spare paper rolls, $50, ONO. VK3SU, QTHR. Ph. (059) 44 3552.

Icom IC22A, serial No. 8882, exc. cond., with instruction manual, xtals for rpts. 2, 3, 4, 5, 6, 7, 8 and simplex channels 40, 49, 50, original, no mods., $240, ONO. VK3YLN. Ph. (03) 842 2260, or C/o VK3BH, QTHR.

Kenwood TS520S, as new, with CW filter, external VFO 520, MC10 mic., operator's and workshop manuals, in orig. cartons, $700, ONO, or will separate; CHIBA SWR-FS meter and Hi-Q balun I tol. 50 ohms, never used, /14 each. VK3PR, QTHR. Ph. (056) 62 2711.

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IC502, 6m SSB, mod., including 40W SS final, $200, or swap for QR666 Rx or similar; Trio 9R59DS Rx, v.g.c., $80; PRC-10 Rx, 38-55 MHz, $35; CB conversion xtals, set of four, $10. Contact Neville VK2QF, QTHR. Ph. (063) 7384 — (operator) 9V A.H.

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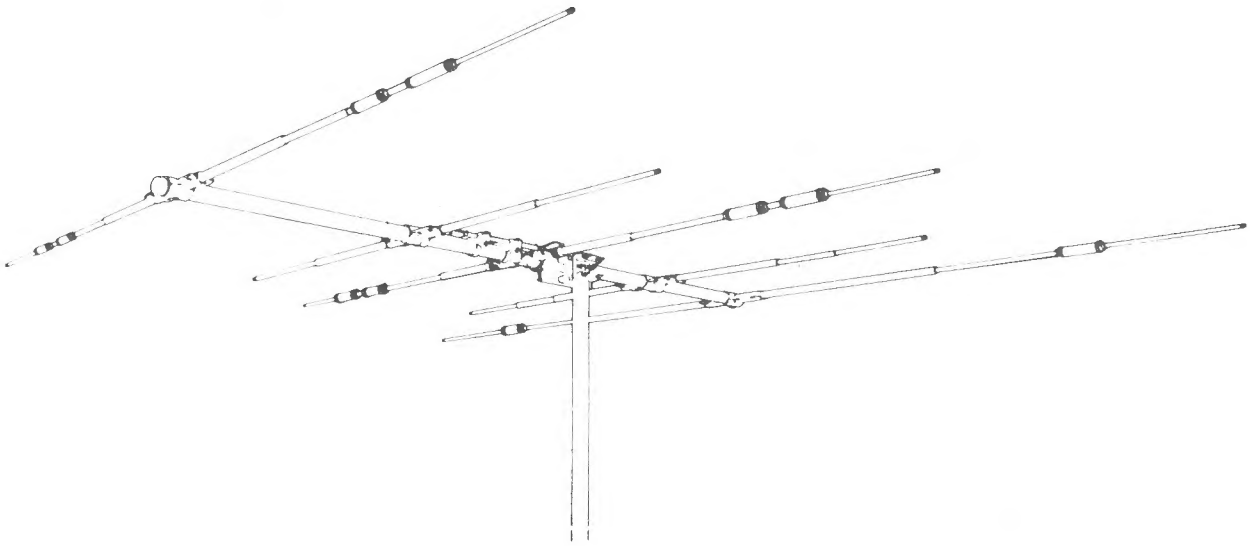

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Boom length	18 feet	VSWR at resonance	less than 1.5:1
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Turning Radius	18 feet	Input Impedance	50 ohms
Surface Area	6.4 sq. feet	−3dB Beamwidth	66° average
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		Front-to-Back Ratio	25 dB

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